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Adults Presenting to an Emergency Department with Non-traumatic Chest Pain: A Case Series

by

Marion E. Marple

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of

Master of Nursing

Faculty of Nursing

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Faculty of Graduate Studies and Research

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Abstract

Non-traumatic chest pain is one of the most common complaints of adults presenting to the Emergency Department. Most of the data available on non-traumatic chest pain and the variables that affect its diagnosis and management come from United States data and therefore may not accurately reflect the Canadian experience. The purpose of this descriptive study was to describe the characteristics, diagnostic evaluation, management strategies, and outcomes of 522 adults with non-traumatic chest pain presenting to the Emergency Department of the University of Alberta Hospital from March to September 2000. Data were obtained from health records on demographic characteristics, risk factors, medical history, symptom characteristics, clinical presentation, diagnostic evaluation, treatments, disposition, and outcomes. Comparisons on the basis of age, gender and final diagnosis revealed similarities to the literature in the areas of demographics, cardiac risk factor profiles, symptom presentation, and management strategies, but differences in time to treatment measures and outcomes.

Dedication

This work is dedicated to my husband Syd, for his patience and support, and to my daughters, Amanda Kathleen and Jessica Elizabeth, for their love and the ability to remind me of the things in life that are truly important. It is also dedicated to my father Joseph Biollo, and the memory of my mother, Kathleen Biollo, who taught me the meaning of diligence.

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CHAPTER ONE

Introduction

Chest pain is the one of the most common complaints of adults presenting to the Emergency Department in the United States; accounting for nearly 10% of visits annually (Levy, Hanlon, & Katko, 1994). In Canada, approximately 200,000 patients are admitted to hospital each year with a diagnosis of chest pain, but only half of them are diagnosed with an Acute Coronary Syndrome (ACS)(Christenson, 1999). Cardiovascular disease is responsible for 36% of deaths in Canada; a greater proportion than death due to accidents, poisonings, violence, and cancer combined (Heart and Stroke Foundation, 1999). Ischemic heart disease (IHD) is implicated in 60% of cardiovascular deaths, with slightly over half that number attributable to myocardial infarction (Heart and Stroke Foundation, 1999). Of deaths directly related to Myocardial Infarction (MI), 50% are due to 'sudden death' (death occurring in the hour following symptom onset), usually before hospital arrival (National Heart Attack Alert Program Coordinating Committee [NHAAPCC], 1994). Many of these deaths are preventable with early presentation to the hospital, as it has been estimated that 40-60% of MI patients have prodromal symptoms that are not taken seriously (Burnett et al., 1995), go unrecognized (Bahr, 1992), or do not meet patients' preconceptions of how a heart attack should feel (Goldberg et al., 1998).

Evaluation and management of the patient with non-traumatic chest pain presents a diagnostic challenge in the Emergency Department (ED). Atypical presentation, non-diagnostic ECGs, comorbid conditions, and incomplete assessment can obscure the correct diagnosis, resulting in inappropriate discharge and negative patient outcomes. For the patient experiencing a MI, inefficiencies in the ED can delay the initiation of

reperfusion therapy, thereby increasing the risk of both short and long term morbidity and mortality. To date, studies examining the way adults with non-traumatic chest pain are evaluated and managed, and the factors that affect their outcomes have all been representative of the American experience. Thus, the characteristics, management, and outcomes of the adult with non-traumatic chest pain need to be described from a Canadian perspective.

Purpose of the Study

The purpose of this study was to describe the characteristics, diagnostic evaluation, management strategies, and outcomes of adults presenting to the Emergency Department at the University of Alberta Hospital with non-traumatic chest pain. Specific research questions to be examined were:

1. What are the demographic characteristics, and clinical presentations of adults presenting to the ED with non-traumatic chest pain?
2. What are the times to treatment for adults presenting to the ED with acute myocardial infarction versus presenting with chest pain and non-diagnostic ECGs?
3. What factors influence the time to treatment for adults presenting to the ED with non-traumatic chest pain?
4. What management strategies are implemented for adults with non-traumatic chest pain in the ED?
5. What factors influence management strategies for adults with non-traumatic chest pain in the ED?
6. What are the outcomes of adults presenting to the ED with non-traumatic chest pain?

7. What factors influence outcomes of patients presenting to the ED with non-traumatic chest pain?

Significance of the Study

Cardiovascular disease is one of the leading causes of morbidity and mortality in North America. Data describing the characteristics, management and outcomes of adults with non-traumatic chest pain presenting to the ED has largely been gathered in the United States. In order to develop strategies that will enhance the care currently provided to this cohort, it is essential that Canadian data be collected. The diversity in population composition as well as differences that exist in the provision of health care, serve to affirm the need to describe the Canadian experience. Data collected during the course of this study can serve as a baseline for quality improvement in time to treatment strategies, with particular emphasis on door to needle times, and may be used to develop fast track protocols for care of the adult with non-traumatic chest pain.

CHAPTER TWO

Review of the Literature

Pathophysiology of Acute Coronary Syndrome

Acute Coronary Syndrome (ACS) includes unstable angina, non-ST-segment elevation MI (NSTEMI), ST-segment elevation MI (STEMI), and sudden cardiac death. ACS represents a spectrum of clinical presentations of the same event; occlusion or obstruction of a coronary artery by a platelet rich thrombus on a ruptured atherosclerotic plaque (White, 1997). The etiology of plaque rupture is unknown, but shear forces, bending or twisting of a stenotic artery in response to myocardial contraction, and bacterial erosion of the fibrous cap (Alexander, 1994; White, 1997), arterial pressure surge and vasoconstriction (Muller, Abela, Nesto, & Tofler, 1994), have all been proposed as triggers. Upon rupture, the lipid rich contents of the plaque are exposed to the surrounding environment triggering platelet activation and aggregation. A single layer of platelets adheres to the exposed surface, while newly activated platelets aggregate to form a plug at the site of fissuring. Fibrinogen is converted to a fibrin mesh that transforms the platelet plug into a clot (Christenson, 1999). The extent to which the clot occludes the blood flow in the artery, as well as the existence of collateral circulation determines the degree of ischemia. Necrosis of the myocardium occurs rapidly once arterial occlusion is complete, and the extent of infarction can be correlated with the duration of occlusion (Reimer, Lowe, Rasmussen, & Jennings, 1977). Early restoration of blood flow to the ischemic area limits infarct size, reduces immediate complications, and reduces the incidence of myocardial dysfunction (Lincoff, Califf, Rutsch for the GUSTO Investigators, 1995). If the occlusion is relieved early enough, irreversible myocardial

damage may be prevented (Newby, 1997). All reperfusion strategies are therefore directed at restoring blood flow in the affected artery as rapidly as possible.

Evidence for the Benefit of Early Reperfusion

Thrombolytic therapy for the acute MI patient has significantly greater benefit for those treated in the first or second hour after the onset of symptoms than those treated in the third to fifth hours (NCAAPCC, 1994). As early as 1986, the GISSI I trial demonstrated an inverse relationship between time to thrombolysis and benefit (Gruppo Italiano per lo Studio della Streptochinasi nell'Infarto Miocardio, 1986). A 47% reduction in mortality was demonstrated in patients who received thrombolytics in the first hour after symptom onset, compared with 17% in patients treated between 3 and 6 hours. This finding was reinforced by the 41,021 patient GUSTO I trial which demonstrated that mortality from acute myocardial infarction increased in a linear fashion as time to treatment increased (The GUSTO Investigators, 1993). Thirty-day mortality based on time from symptom onset to treatment with streptokinase or t-Pa was: 0-2 hours, 5%; 2-4 hours, 6.3%; and 4-6 hours 9.2% (The GUSTO Investigators, 1993). The Myocardial Infarction Triage and Intervention (MITI) trial compared pre-hospital initiated thrombolysis with hospital initiated thrombolysis and found that while outcomes were similar for both groups, patients treated less than 70 minutes after symptom onset had a mortality rate of 1.2% compared with 8.7% for those treated after 70 minutes (Weaver, Cequiera, Hallstrom, et al., 1991). In addition, patients treated within 70 minutes of symptom onset had infarcts that were significantly smaller that those treated later (Newby, 1997).

Clinical trials with an angiographic component provided further evidence that early reperfusion improves outcome. The Thrombolysis in Myocardial Infarction (TIMI) 1 trial examined the rate of reperfusion and left ventricular function in patients receiving streptokinase or t-PA in the setting of acute MI. Patients who achieved reperfusion by 90 minutes had a 1-year mortality of 8.1%, compared to 14.8% for those who did not (Dalen, Gore, & Braunwald for the TIMI Investigators, 1988). Combined data from 4000 patients in TIMI 4, TIMI 5, Thrombolysis and Angioplasty in Myocardial Infarction (TAMI), and Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries (GUSTO) angiographic substudy demonstrated a 30-42 day mortality of 3.6% for patients with a TIMI 3 flow at 90 minutes compared to 9.5% for those patients who exhibited TIMI 0/1 flow at the same timepoint (Cannon & Braunwald, 1994). Despite the evidence for the benefits of early reperfusion, time to treatment remains a challenge.

Time to Treatment

Time to treatment refers to the interval from the onset of symptoms indicative of MI, to initiation of therapy. The National Heart Attack Alert Program Coordinating Committee (NHAAPCC) recommendations state that patients should receive treatment within 30 minutes of Emergency Department arrival and within 60 minutes of symptom onset (NHAAPCC, 1994). The majority of MI patients do not receive the benefit of thrombolytics and other treatment within the first hour after onset of symptoms (Ho, Eisenberg, Litwin et al., 1989; Kereiakes, Weaver, Anderson et al., 1990; Meischke, Larsen, Eisenberg, 1998; Sharkey, Brunette, & Ruiz, 1989; Turi, Stone, & Muller, 1986;). In the GUSTO I study, median arrival times after symptom onset were 85

minutes in the United States, compared to 105 minutes for patients elsewhere (Newby et al. for the GUSTO I Investigators, 1996). Time to treatment is typically divided into 3 phases: decision phase (time from onset of symptoms to decision to seek treatment); transit phase (time required for transport to hospital); and treatment phase (hospital arrival to initiation of treatment).

Decision Phase

As early presentation and treatment are significant factors in patient prognosis, researchers are interested in determining how environmental, social, and contextual variables influence the decision to seek medical care in this population.

Sociodemographic characteristics. The GUSTO I study reviewed data from 39,833 patients in an effort to examine the relationships among personal characteristics, time to thrombolysis, and outcomes. Both female gender and increased age were positively correlated with a delay in presentation. This reflects the results of earlier studies that also identified female gender and advanced age as risk factors for delayed presentation (Hackett & Cassem, 1969; Maynard et al., 1989; Pole, 1974; Pressley, Wilson, Severance et al., 1984 Turi, et al., 1986). Meischke et al. (1998) performed a retrospective analysis on 4,497 CCU patients and again found that female gender and age were correlated with a delay in presentation. Reilly, Dracup, and Dattolo (1994) also found a positive correlation between advanced age and presentation delay. The GUSTO I study found that smokers (both current and former) were represented in greater proportions in the early presentation groups than in those groups of patients presenting later (Newby et al., 1996).

Cooper and colleagues (1986) examined race as a factor in delayed presentation, and found the median delay in seeking treatment was twice as long for blacks (6.9 hours)

compared to whites, and three times as long for the mean delay (20.2 hours)(Lee, 1998). Clark, Bellam, Shah and Feldman (1992) also reported longer median and mean times (3 hours; 13.1 ± 25.5 hrs.) among blacks, Hispanics (4 hours; 12.4 ± 2.9 hrs) compared to Whites (2 hrs; 3.3 ± 2.9 hrs). It should be noted that both of the aforementioned studies were small in size (n = 111; n = 315, respectively), and the samples were drawn from hospitals that served populations with a large number of economically disadvantaged individuals. The interaction of socioeconomic status and ethnicity was examined by Ell et al. (1994) who found that black patients with chest pain who were poor, uninsured, or without a regular physician were more likely to delay in seeking treatment than blacks of higher socioeconomic status. In addition, blacks presenting to a public hospital took 2.5 times longer to present than blacks who went to a private facility (Ell et al., 1994). This seems to support the assertion, that interplay between socioeconomic status and ethnicity is more of a factor than ethnicity alone. The GUSTO I study found no relationship between ethnicity and presentation delay (Newby et al, 1996).

Symptom context. In addition to personal characteristics, researchers have also queried whether symptom context influences the decision to seek medical care. Occurrence of symptoms on a weekend has been associated with both increased delay (Moss, Wynar, & Goldstein, 1969) and decreased delay (Wielgosz, Nolan, Earp, Biro, & Wielgosz, 1988). Similar results have been observed with time of onset of symptoms. Daytime onset was found to prolong delay in some studies (Alonzo, 1986; Moss et al., 1969; Moss & Goldstein, 1970) and decrease it in others (Gilchrist, 1973). Reilly et al. (1994) found pain starting between 3 and 11 p.m. to be most strongly associated with early presentation, but overall did not have a significant effect on presentation delay. Patients

who experienced chest pain in the home tended to delay longer than those who experienced chest pain in settings such as the workplace (Mantell, Berrios, Flanagan et al., 1989; Moss & Goldstein, 1970; Turi et al., 1986; Zucker, Griffith, Beshansky et al., 1997). Witnesses also affected the amount of time taken to seek treatment. Hackett and Cassem (1969) first identified that if friends or associates were present, the median delay was 2 hours, whereas if family members were present, the median delay was 12 hours. Similarly, if a spouse (particularly if the spouse was female) was the first to be informed about the symptoms, delay tended to be significantly longer than if a non-family member was informed (Alonzo, 1986). Reilly et al. (1994) found that patients who were alone or with friends were more likely to present in less than 3 hours, while those with family present were more likely to delay longer than 3 hours.

Symptom characteristics and medical history. The key to decreasing the delay in seeking medical attention is education of the general public about warning signs and symptoms of myocardial infarction. Much of the information that is used for education purposes was gathered from white males from the middle class (H. Lee, 1998). Research examining the potential causes of delayed presentation has revealed that patients often misinterpret their symptoms, because they are unlike the "typical" symptoms described in the educational material and do not include "chest pain" (H. Lee, 1998). In addition, patients with comorbidities may attribute symptoms such as dyspnea or fatigue to worsening of an existing condition or as part of their chronic illness (Kinlen, 1973). Finally, patients may simply exhibit unproductive responses such as pretending nothing is wrong, hoping the pain will resolve, or try self medication or position change (Dracup & Moser, 1997). Many studies found a family history of heart disease (Newby et. al, 1996),

coronary artery disease or previous MI to be associated with earlier arrival at the hospital (Hackett & Cassem, 1969; Maynard et al., 1989; Newby et al., 1996; Tjoe & Luria, 1972; Turi et al., 1986), yet, Dracup and Moser (1997) did not find medical history to be statistically significant. Presentation delay is noted in patients with a history of anginal episodes, hypertension, and diabetes (Dracup & Moser, 1997; Maynard et al., 1989; Moss & Goldstein, 1970; Newby et al., 1996; Tjoe & Luria, 1972). Meischke et al. (1998) found that women were more likely to report shortness of breath and nausea/vomiting than men were. This finding was magnified in women less than 67 years of age and in women with diabetes. Men in contrast were more likely to report sweating. No difference was observed by gender in the reporting of chest pain. Both chest pain and diaphoresis were associated with statistically significant earlier presentation, as was syncope, though to a lesser extent. The influence of dyspnea, epigastric pain and nausea/vomiting was not statistically significant on presentation delay. Of all the symptoms examined, diaphoresis was most strongly related to earlier presentation. This may be because sweating in the absence of a fever or physical exertion is interpreted as something out of the ordinary and therefore indicative of the need for medical attention (Meischke et al., 1998).

Transit Phase

Once the decision to seek assistance has been made, issues surrounding transportation to hospital arise. In spite of easy access to Emergency Medical Services (EMS) in most communities, approximately half the patients arrive by some other method (Ho, Eisenberg, & Litwin, 1989; Sharkey, Brunette, & Ruiz, 1989). Surprisingly, the incidence of cardiac arrest among patients attempting to reach the hospital by car, is very low compared to those transported by EMS, suggesting a self-selection process

(Becker, Larsen, & Eisenberg, 1996). Self transport or transport by family members is associated with a delay in presentation (Meischke et al., 1998). High performance EMS have the capability to transmit a 12 lead ECG to the receiving facility thereby decreasing the treatment delay upon arrival (Cannon et al. 1994; Moore, 1997). Five clinical trials have been conducted examining the benefit of prehospital versus hospital-initiated thrombolysis. Individually none of the trials demonstrated a statistically significant benefit to pre-hospital thrombolysis in the reduction of short-term mortality, but when a meta-analysis was performed, a statistically significant benefit ($p = .03$) was found, with a 17% reduction of risk (Moore, 1997). Although the American College of Cardiology/American Heart Association (ACC/AHA) guidelines (1996) do not recommend prehospital thrombolysis be included in the role of EMS, there is ongoing interest in this strategy, and a recently completed clinical trial (ASSENT III +) with a single bolus thrombolytic demonstrated a 45 minute reduction in time to treatment using this regimen (Wallentin et al., 2002).

Treatment Phase

The third component of the time to treatment equation is the treatment phase, which begins with hospital arrival. The GUSTO I Time to treatment substudy outlined four time-points that serve as descriptors of where delays in treatment can occur (Newby et al., 1996). These are Door (time of hospital arrival), Data (time of ECG), Decision (Time of decision to administer thrombolytic), and Drug (Initiation of thrombolytic). Delays at any point after hospital arrival are collectively referred to as treatment delays. NHAAPCC (1994) guidelines recommend a door to drug time of 30 minutes or less, which is congruent with the ACC/AHA (1996) recommendation of a 30-60 minute door

to drug time (Ryan et al., 1996). Review of the literature indicated that this is a difficult goal to achieve. The GUSTO I trial found that patients outside the US had a slightly shorter treatment delay compared to US patients (median 60 minutes versus 66 minutes) Only 43% of patients in the study were treated within 1 hour of arrival (Newby et al., 1996). Previous studies revealed mean delays of 60-90 minutes (Ho, Eisenberg, & Litwin, 1989; Kereiakes, Weaver, & Anderson, 1990; Sharkey, Brunette, & Ruiz, 1989). The GUSTO I time to treatment substudy conducted in 80 North American hospitals found the median time to treatment was 70 minutes, and fewer than 5% were treated within 30 minutes (Kline, Smith & Martin, 1996). Analysis of baseline characteristics from the main trial revealed risk factors for treatment delay to be similar to those for presentation delay: age > 65 years, female gender, diabetes, hypertension, and previous angina. Family history of coronary artery disease, and previous MI were associated with a decrease in presentation delay, but an increase in treatment delay. History of coronary artery bypass surgery and non-Caucasian race were not found to have any effect on presentation delay, but were responsible for an increased treatment delay (Newby, 1997).

Door to Data. Although this interval starts with hospital arrival, it can be affected by events associated with the transit phase. A good quality ECG obtained and transmitted by EMS can effectively reduce the door to data time to zero, and treatment decisions can be made rapidly upon arrival. Once the patient arrives in the ED, delays may occur secondary to inefficient triage procedures, inexperienced staff (pre-hospital care provider or triage nurse), or incorrect assessment of the patient's condition (NHAAPCC, 1994). A patient arriving by private vehicle does not benefit from advance warning of his arrival, and may also experience delays secondary to inefficient registration or triage.

Registration and security staff can facilitate prompt assessment of the walk-in patient if educated to recognize signs that may identify the patient in distress. Lack of efficient triage can result in the patient waiting in a registration or triage queue for an indefinite period of time rather than being taken into the treatment area for assessment (Bracken, 1997). Once a patient is taken into the treatment area, no more than 5 minutes should elapse before an ECG is performed (NHAAPCC, 1994). Circumstances which also serve to increase the door to data time included the need to page someone from outside the ED to perform the ECG, the need for a physician to order the ECG, and lack of a clear treatment pathway for the patient with chest pain (NHAAPCC, 1994; Bracken, 1997).

Door to Decision. Once the ECG has been obtained, it must be read by the physician. Personal delivery to the physician eliminates the possibility of it sitting on the chart for an indefinite period of time before viewing occurs. Difficulty obtaining the past medical history, with special attention to the presence of contraindications to thrombolysis and the details of the chief complaint, can also result in a delay in decision-making. The patient with atypical symptoms, borderline ECG criteria for thrombolysis, left bundle branch block, ST elevation thought to be present in the past but lacking a previous ECG for comparison, insufficient training of the physician in ECG interpretation, incorrect diagnosis of the automated system, as well a lack of a mechanism for timely cardiology consultation have also been identified as contributing to a delay in reaching a decision (NHAAPCC, 1994; Bracken, 1997). Lack of interviewing skills, language barriers, and inability of the patient to articulate their experiences clearly can also contribute to delay (Bracken, 1997; NHAAPCC, 1994).

Decision to Drug. Once the decision to administer thrombolytics has been reached, delay should be minimized. The ED physician should have the authority to order and administer thrombolytic without the necessity of a Cardiology consult (NHAAPCC, 1994). McKendall, Woolard, & McDonald, (1992) demonstrated a decrease of 50% in administration time when the ED physician was able to order and administer thrombolytic. Conversely, the ability to obtain a consult in a timely manner should be available for patients with complicated presentations, relative contraindications to thrombolysis, or situations where the diagnosis is unclear (NHAAPCC, 1994). The patient should receive an explanation of the benefits and risks of thrombolysis but not at the expense of timely administration. Thrombolytics kept in the room where administration occurs, rather than in a remote location such as the hospital Pharmacy reduces time to administration. Some ED's advocate the use of a "clot box" which can be taken to the bedside, and contains everything required to prepare and administer the thrombolytic (Bracken, 1997). Finally, a standardized protocol for thrombolytic administration can be developed for use in the ED. The document can integrate an inclusion and exclusion criteria checklist, mixing and administration instructions, and all data and timepoints to be recorded. Time of onset of symptoms, hospital arrival, initial ECG (and qualifying ECG if not the initial ECG), decision to treat, and time of administration should be recorded for quality improvement purposes (NHAAPCC, 1994).

Diagnostic Challenges

Time to treatment issues largely focus upon the patient with an acute MI and diagnostic ECG changes. There are however, a far larger number of patients who present with chest pain or chest pain equivalent, whose ECGs are of no benefit in determining

whether the problem is cardiac in origin. This group presents a diagnostic challenge to the Emergency Department physician responsible for managing their care. Although patients complaining of chest pain comprise less than 10% of all visits to the ED in the United States, this group accounts for 20% of awards in malpractice cases against American ED physicians (Hoekstra & Gibler, 1997; Karcz et al., 1993). Studies examining the incidence of missed diagnosis and inappropriate discharge in the patient presenting with chest pain, found the incidence to be 7.7% (Schor, Behar, & Modan, 1976), 3.8% (T. H. Lee, Rouan, Weisberg, Brand, et al., 1987; Rouan et al., 1987), 1.9% (McCarthy et al., 1993), and 2.3% (Pope et al., 2000).

Rusnak, Stair, Hansen, and Fastow (1989), examined 65 malpractice claims of patients discharged inappropriately from the ED with acute MI in order to determine the signs, symptoms, patient presentations, and physician characteristics most closely correlated with misdiagnosis. Fifty-three of the 65 patients died. Factors positively associated with litigation were the failure to take and record a careful history (none of the 65 patients had a complete chest pain history recorded even when the presenting complaint was non-traumatic chest pain) and misinterpretation of the ECG. Chest pain was the presenting complaint of 41 of 65 patients, but only 28 of 41 had an ECG performed. Of the 28 ECGs, 11 revealed ischemia or infarction that was missed by the ED physician. The patients with missed MI were younger (less than 49 years); had atypical presentations for MI; had seen a physician in the previous week with similar complaints; and had fewer ECGs, of which a smaller proportion were diagnostic of MI. Physicians involved in litigation for inappropriate discharge had less than 2.6 years of ED experience, performed less thorough histories and physical exams, were less likely to be

board certified in any specialty, and misinterpreted more ECGs (Rusnak et al., 1989). McCarthy et al. (1993) studied 5,773 patients presenting to the ED with complaints of chest discomfort, pressure, or pain; upper abdominal pain or nausea; dizziness; syncope; shortness of breath or difficulty breathing. There were 1,050 patients diagnosed with MI, and of these, 20 were not admitted (missed diagnosis rate of 1.9%). Characteristics associated with inappropriate discharge included no history of CAD as evidenced by previous MI or nitroglycerine use, less radiation of pain to arms or neck, and abnormal ECGs (only 30% of inappropriately discharged patients had normal or nonspecific ECGs). This supports the finding of T. H. Lee, Rouan, Brand and the Chest Pain Study Group (1987) that 49% of missed myocardial infarctions could have been diagnosed with improved ECG interpretation skills.

Studies on missed diagnosis of chest pain in the ED provide evidence that one of the most difficult tasks faced by the ED physician is patient disposition. The ECG is diagnostic in only about 50% of patients presenting with acute MI (Gibler et al., 1995; Ornato, 1999); therefore, additional risk stratification must be employed to determine whether the patient should be admitted or can be safely discharged home. The desire to provide quality care while maintaining cost effectiveness, as well as the desire to avoid litigation, has led to more liberal admission practices for patients with chest pain (Gibler et al., 1995). Of all patients with "chest pain complex" presenting to the ED, 10-15% will be diagnosed with acute MI (Goldman et al., 1988; Rouan et al., 1987; Tierney et al., 1986), 10 to 15% will be diagnosed with unstable angina, 20-30% will be diagnosed with a problem not of cardiac origin, leaving 40-60% of patients with unexplained chest pain (Joseph, 1997). Ting et al. (1991) determined that 50-60% of patients presenting with

chest pain required an extensive evaluation to arrive at a diagnosis. In the past, the majority of this group would have been admitted to the hospital with a diagnosis of rule-out MI; however, the growth of ED Chest Pain Observation Units have allowed patients to be evaluated successfully in an outpatient setting. Furthermore, this can be accomplished at 20-50% the cost of an inpatient evaluation (DeLeon, Farmer, King, Manternach, & Ritter, 1989; Gaspoz, et al., 1991; Hoekstra et al. 1994). Consequently, only about 30 to 40% of patients admitted to a Coronary Care Unit (CCU) are actually diagnosed with a coronary event (Gibler et al., 1995; T. H. Lee, Rouan, & Weisberg et al., 1987).

Summary

Non-traumatic chest pain is one of the most common complaints of patients presenting to the Emergency Department. Diagnosis and management is influenced by personal, situational, environmental, and financial variables. By utilizing the data gleaned through research, healthcare providers and administrators can improve the quality of care provided to the patient with non-traumatic chest pain. Most of the available data on non-traumatic chest pain and the variables that affect its diagnosis and management are descriptive of the American milieu and may not accurately reflect the Canadian experience.

CHAPTER THREE

Method

The purpose of this study was to describe the characteristics, diagnostic evaluation, management strategies, and outcomes of adults with non-traumatic chest pain presenting to the Emergency Department at the University of Alberta Hospital.

Design

A descriptive, retrospective study of adults with non-traumatic chest pain presenting to an Emergency Department was conducted. Health records were reviewed to obtain data on demographic characteristics, risk factors, medical history, symptom characteristics, clinical presentation, diagnostic evaluation, management strategies, time to treatment, disposition, and outcomes.

Sample and Setting

The sample included all adults, 18 years of age and older, presenting to the Emergency Department at the University of Alberta Hospital with a chief complaint of non-traumatic chest pain. Non-traumatic chest pain includes chest pain/discomfort as well as chest pain equivalents such as dyspnea, and symptoms known to be indicative of myocardial ischemia such as epigastric pain, pain in the arm(s), throat, or jaw, nausea/vomiting, diaphoresis, profound weakness, and syncope. The University of Alberta Hospital is a major tertiary care centre for North and Central Alberta, as well as the Yukon and Northwest Territories. Approximately 56,000 patients are treated in the University of Alberta Hospital Emergency Department each year.

Data Collection Protocol

Data was collected retrospectively from the period of March 2000 to September 2000 on all adults presenting to the ED with non-traumatic chest pain. An inventory of 27,007 adults presenting to the ED, along with the presenting complaint was obtained from the Health Records Department. The researcher identified 3,449 adults with a complaint consistent with chest pain or chest pain complex, and their charts were requested from Health Records for review. Of the requested number, 398 were unavailable to the researcher due to inability of the staff to locate the chart or required volume, the patient was currently admitted to the hospital, the chart was in use by the legal department or another researcher, or was awaiting completion in the incomplete charts area. Of the 3,051 health records that were examined, 2,529 were rejected as they reflected a variety of medical, surgical, and psychiatric concerns, not appropriate for inclusion in the sample. A data collection form (Appendix A) was completed on the remaining 522 health records.

Data Analysis

All statistical analyses were conducted using Statistical Program for the Social Sciences for Windows (SPSS 11.0.1). Descriptive statistics including the median, mean, standard deviation, range, and percentages were calculated on all specified variables. Chi-square or independent *t*-tests were conducted to describe differences among specific subgroups, namely gender, age (over 65 years vs. 65 years and younger), and final diagnosis of MI or non-MI. The level of significance was $p \leq .05$.

Ethical Considerations

Ethical approval was obtained from the Health Ethics Research Board at the University of Alberta. To maintain confidentiality, a study number was used to identify the subjects on the data collection form. The study number assigned to each subject was recorded next to the hospital identification number and maintained on a separate record. Data will be stored in a SPSS file for future studies following receipt of ethical approval.

CHAPTER FOUR

Presentation of the Findings

The purpose of this study was to describe the characteristics, diagnostic evaluation, management strategies, and outcomes of adults with non-traumatic chest pain presenting to the Emergency Department at the University of Alberta Hospital. Descriptive statistics including the median, mean, standard deviation, range, and percentages were calculated on specific variables outlined in the data collection form (Appendix A). Chi-square or independent *t*-tests were conducted to describe differences among specific subgroups, namely gender, age (over 65 years vs. 65 years and younger), and final diagnosis of MI or non-MI.

Throughout the presentation of findings, comparisons are made within five categories on the basis of gender, age, and final diagnosis. In addition to the total sample, the other four categories include "men only" and "women only" subgroups, and MI and non-MI subgroups. The total sample will be evaluated on the basis of gender, age (over 65 years vs. 65 years and younger), and final diagnosis (MI vs. non-MI). Gender exclusive subgroups contain comparisons on the basis of age and final diagnosis, and MI and non-MI subgroups have comparisons drawn on the basis of gender and age. Within the MI subgroup, patients with ST segment elevation MI (STEMI) are compared to those with non-ST segment elevation MI (NSTEMI) for select variables.

Data are described commencing with a gender comparison for the total sample, MI, and non-MI subgroups, followed by age comparisons for the total sample, gender exclusive subgroups, and MI and non-MI subgroups.

Demographic Characteristics of Patients Presenting to the Emergency Department

The demographic characteristics of the 522 patients included in the study are found in Table 1. The total sample was composed of 57.5% (n = 300) men and 42.5% (n = 222) women. The non-MI subgroup was similarly composed, with 55.6% (n = 243) men and 44.4% (n = 194) women, while the MI subgroup was 67.1% (n = 51) men and 32.9% (n = 25) women.

The mean age for the total sample was 61.4 years (SD = 15.45). Men ranged in age from 19 to 91 years with a mean of 61.06 years (SD = 14.94), while women ranged from 20 to 91 years and were marginally older, with a mean age of 61.86 years (SD = 16.14). In the total sample, 45.7% (n = 137) men were over 65 years of age, compared to 50.9% (n=113) of women. The largest number of patients were 70 to 79 years of age (n = 141), followed by 60 to 69 years, (n = 105), and then 50 to 59 years (n = 100). The only statistically significant difference between the men and women in any age bracket, occurred in the 80 to 89 age group, where women (60.9%) outnumbered men (39.1%), ($\chi^2 = 6.943$, p = .008). Patients in the MI subgroup ranged from 40 to 91 years of age, and had a mean age of 68.62 years (SD = 11.86), with 64.5% (n=49) being older than 65 years and 35.5% (n=27) were 65 years of age or younger. The non-MI subgroup had an average age of 60.20 years (SD = 15.65) and ranged from 19 to 91 years. Within the non-MI subgroup, 45.1% (n = 197) were over the age of 65, and 54.9% (n = 240) were 65 years of age or younger. Women outnumbered the men in the 80 to 89 age group, representing 65.6% (n=21) of the non-MI subgroup, compared to 34.3% (n = 11) for the men ($\chi^2 = 6.305$, p = .012).

Patients suffering a MI were more likely to be over the age of 65 years (19.9%, n = 49), than 65 years or younger (10.1%, n =27), ($\chi^2 = 9.756$, p = .002). Nine patients did not have a final diagnosis recorded on their chart, and could not be included in the sub-group analysis.

Table 1
Age of Patients Presenting to the Emergency Department by Gender

Age (years)	Total N (%)	Men N (%)	Women N (%)	p
Total sample				
> 65 years	250 (47.9)	137 (54.8)	113 (45.2)	.237
≤ 65 years	272 (52.1)	163 (59.9)	109 (40.1)	
MI subgroup				.142
> 65 years	49 (64.5)	30 (61.2)	19 (38.8)	
≤ 65 years	27 (35.5)	21 (77.8)	6 (22.2)	
Non-MI subgroup				
> 65 years	197 (45.1)	105 (53.3)	92 (46.7)	.379
≤ 65 years	240 (54.9)	138 (57.5)	102 (42.5)	

Age (years)	Total N (%)	Men N (%)	Women N (%)	p
19-29	18 (3.5)	10 (3.3)	8 (3.6)	.867
30-39	25 (4.8)	14 (4.7)	11 (5.0)	.897
40-49	82 (15.7)	46 (15.3)	36 (16.2)	.784
50-59	100 (19.2)	61 (20.3)	39 (17.6)	.427
60-69	105 (20.1)	65 (21.7)	40 (18.0)	.304
70-79	141 (27.0)	82 (27.3)	59 (26.6)	.847
80-89	46 (8.8)	18 (6.0)	28 (12.6)	**.008**
90-91	5 (0.9)	4 (1.3)	1 (0.5)	.400

	MI Subgroup				Non-MI Subgroup			
Age (yrs)	Total N (%)	Men N (%)	Women N (%)	p	Total N (%)	Men N (%)	Women N (%)	p
19-29					18 (4.1)	10 (4.1)	8 (4.1)	.996
30-39					13 (3.0)	13 (5.3)	11 (5.7)	.884
40-49	4 (5.3)	3 (5.9)	1 (4.0)	1.000	76 (17.4)	42 (17.3)	34 (17.5)	.947
50-59	16 (21.1)	11 (21.6)	5 (20.0)	.875	82 (22.9)	48 (19.8)	34 (17.5)	.554
60-69)	17 (22.4)	12 (23.5)	5 (20.0)	.729	87 (19.9)	52 (21.4)	35 (18.0)	.382
70-79	25 (35.2)	16 (31.4)	9 (36.0)	.687	115 (26.3)	65 (26.7)	50 (25.8)	.818
80-89	12 (16.9)	7 (13.7)	5 (20.0)	.515	32 (22.9)	11 (4.5)	21 (10.8)	**.012**
90-91	2 (2.8)	2 (3.9)		1.000	3 (2.3)	2 (0.8)	1 (0.5)	1.000

Data on marital status was available on 505 (96.7%) of the patients and is presented in Table 2. Assessment of the total sample revealed that 74.7% of the men (n = 216)

compared to 50.9% of women (n = 110) were married ($\chi^2 = 27.423$, p = < .001). This was also the case in the MI subgroup, in which 68.0% (n = 34) of the men versus 32.0% (n = 8) of the women were married (χ^2 8.155, p = .004). In the non-MI subgroup, 76.0% of men (n = 177) were married, compared to 53.7% (n = 101) of the women ($\chi^2 = 20.121$, p. < .001). Women in the total sample (26.4%) were more likely to be widowed than men (6.9%), ($\chi^2 = 36.255$, p< .001), as well as in the MI (χ^2 =14.098, p < .001) and non-MI (χ^2 = 24.065, p < .001) subgroups. Women (8.8%) in the total sample were more likely than men (1.7%) to be divorced (χ^2 = 13.816, p < .001). This finding was also present in the non-MI subgroup (χ^2 =13.816, p. < .001). In the categories of "single", "separated" and "common-law", there were no significant differences between men and women in the total sample or in the subgroups.

Marital status categories were collapsed into two groups, designated as single (single, widowed, divorced, and separated) and married (married, common-law). Women in the total sample ($\chi^2 = 30.828$, p < .001), the MI subgroup ($\chi^2 = 9.000$, p = .003), and the non-MI subgroup ($\chi^2 = 21.754$, p < .001) were more likely to be single than men. Patients over the age of 65 years in the total sample, MI subgroup and non-MI subgroup were more likely to be single than patients 65 years of age and younger, but this was only statistically significant in the total sample (χ^2 =6.506, p = .011). Of the patients who experienced an MI, a greater proportion in the total sample (18.3% vs. 13.6%), the "men only" subgroup (21.2% vs. 16.6%) and "women only" subgroup (16.3% vs. 7.8%) fell into the "single" as opposed to the "married" category, but none of these findings were statistically significant.

Table 2
Marital Status of Patients Presenting to the Emergency Department by Gender

Marital Status	Total N (%)	Men N (%)	Women N (%)	p
Married	326 (64.6)	216 (74.7)	110 (50.9)	**<.001**
Single	62 (12.2)	38 (13.2)	24 (11.1)	.490
Widowed	77 (15.2)	20 (6.9)	57 (26.4)	**<.001**
Divorced	24 (4.8)	5 (1.7)	19 (8.8)	**<.001**
Common-law	13 (2.6)	7 (2.4)	6 (2.8)	.789
Separated		3 (0.6)	3 (1.1)	.265

	MI Subgroup				Non-MI Subgroup			
Marital Status	Total N (%)	Men N (%)	Women N (%)	p	Total N (%)	Men N (%)	Women N (%)	p
Married	42 (56.0)	34 (68.0)	3 (12.0)	**.004**	278 (66.0)	177 (76.0)	101 (53.7)	**<.001**
Single	10 (13.3)	7 (14.0)	8 (32.0)	1.000	52 (12.4)	31 (13.3)	21 (11.2)	.508
Widowed	19 (25.3)	6 (12.0)	6 (24.0)	**<.001**	56 (13.3)	14 (6.1)	42 (22.3)	**<.001**
Divorced	1 (1.3)	1 (2.0)		.481	23 (5.5)	4 (1.7)	19 (10.1)	**<.001**
Common-law	3 (4.0)	2 (4.0)	1 (4.0)	1.000	9 (2.1)	4 (1.7)	5 (2.7)	.521
Separated					3 (0.7)	3 (1.3)		.257

Cardiac Risk Factors and Medical History

Cardiac Risk Factors

The subjects' cardiovascular risk factors are found in Tables 3 to 7. Of the patients for whom an assessment of cardiovascular risk factors was documented, 20.8% (n = 97) were diabetic, 23.4% (n = 89) were current smokers, 41.8% (n = 146) reported a family history of cardiovascular disease, 59.6% (n = 193) were dyslipidemic, and 54.6% (n = 211) gave a history of hypertension.

Comparison on the basis of gender revealed that men (27.3%) were more likely to be smokers than women (16.8%) in the total sample ($\chi^2 = 5.530$, $p = .019$), and in the non-MI subgroup ($\chi^2 = 6.142$, $p = .013$). There were also more men (26.1%) than women (16.7%) in the MI subgroup who smoked, but the difference was not statistically significant. Patients 65 years of age and younger were more likely to be smokers than their older counterparts in the total sample ($\chi^2 = 31.863$, $p < .001$), the MI ($\chi^2 = 11.901$,

p = .001) and non-MI (χ^2 = 21.917, p <.001) subgroups, as well as the "men only" (χ^2 = 20.830, p < .001) and "women only"(χ^2 = 11.901, p =.001) subgroups. There were no statistically significant differences in the number of smokers on the basis of final diagnosis, in either the total sample or the gender exclusive subgroups.

As was the case with smokers, men (28.3%) were more likely to be diabetic than women (14.4%) in the total sample (χ^2 = 7.706, p = .006) and the non-MI (χ^2 = 6.307, p = .012) subgroup. Analysis on the basis of age revealed that patients in the total sample (χ^2 = 9.624, p = .002) and the non-MI subgroup (χ^2 = 10.790, p = .001), as well as men (χ^2 = 4.775, p = 0.29) and women (χ^2 = 6.838, p = .009) over the age of 65 years were more likely to be diabetic than their younger counterparts. There were no statistically significant differences in the incidence of diabetes on the basis of final diagnosis.

Only men 65 years of age or younger were likely to report a statistically significant family history of cardiac disease (χ^2 = 4.926, p = .026).

There were no statistically significant differences between men and women in the reporting of dyslipidemia. Women over the age of 65 (χ^2 = 11.750, p = .001), as well as patients over 65 in the total sample (χ^2 = 6.339, p = .012), and the non-MI subgroup (χ^2 = 5.703, p =.017), were more likely to be dyslipidemic than those 65 years of age and younger.

Women were more likely than men to give a history of hypertension in all categories, but only in the total sample (χ^2 = 5.817, p = .016) was it found to be statistically significant. Patients over the age of 65 were more likely to report a history of hypertension than their younger counterparts in the total sample (χ^2 = 21.525, p < .001) and non-MI subgroup (χ^2= 15.107, p < .001). This finding extended to both men

(χ^2 = 5.150, p = .023) and women (χ^2 = 20.987, p < .001) when the gender exclusive subgroups were analyzed. In the total sample, patients with a final diagnosis of MI were more likely to report hypertension than those with a diagnosis other than MI (χ^2 = 5.713, p = .017). In the gender exclusive subgroups, hypertension was more prevalent in women with a final diagnosis of MI, than in their non-MI counterparts (χ^2 = 9.048, p = .003).

Table 3
Cardiac Risk Factors of Patients Presenting to the Emergency Department by Age and Gender

Cardiac Risk Factor	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Current Smoker	89/381 (23.4)	65 (27.3)	24 (16.8)	**.019**	19 (10.5)	70 (35.0)	**< .001**
Diabetes	97/466 (20.8)	70 (28.3)	27 (14.4)	**.006**	60 (26.9)	37 (15.2)	**.002**
Family History	146/344 (42.4)	83 (38.6)	63 (48.8)	.063	62 (37.6)	84 (46.9)	.080
Dyslipidemia	193/324 (59.6)	122 (59.2)	71 (60.2)	.867	110 (66.3)	83 (52.5)	**.012**
Hypertension	211/386 (54.7)	125 (52.3)	86 (58.5)	.235	132 (66.0)	79 (42.5)	**< .001**

Table 4
Cardiac Risk Factors of Patients Presenting to the Emergency Department by Age and Gender (MI Subgroup)

Cardiac Risk Factor	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Current Smoker	15/64 (23.4)	12 (26.1)	3 (16.7)	.327	4 (9.8)	11 (47.8)	**.001**
Diabetes	21/73 (28.9)	16 (32.7)	5 (20.8)	.295	13 (28.3)	8 (29.6)	.901
Family History	25/62 (40.3)	17 (38.6)	8 (44.4)	.672	13 (35.1)	12 (48.0)	.311
Dyslipidemia	35/56 (62.5)	27 (62.8)	8 (61.5)	.591	21 (65.6)	14 (58.3)	.577
Hypertension	48/71 (67.6)	28 (58.3)	20 (87.0)	**.016**	34 (75.6)	14 (53.8)	.060

Table 5
Cardiac Risk Factors of Patients Presenting to the Emergency Department by Age and Gender (Non-MI Subgroup)

Cardiac Risk Factor	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Current Smoker	73/309 (23.6)	53 (28.5)	20 (16.3)	**.013**	15 (10.9)	58 (33.7)	**< .001**
Diabetes	76/384 (19.8)	54 (24.1)	22 (13.8)	**.012**	47 (27.2)	29 (13.7)	**.001**
Family History	121/276 (43.8)	66 (39.8)	55 (50.0)	.093	49 (38.9)	72 (48.0)	.129
Dyslipidemia	155/262 (59.2)	93 (58.9)	62 (59.6)	.903	87 (66.4)	68 (51.9)	**.017**
Hypertension	160/308 (52.0)	95 (51.1)	65 (53.3)	.705	96 (63.2)	64 (41.0)	**< .001**

Table 6
Cardiac Risk Factors of Men Presenting to the Emergency Department by Age and Final Diagnosis

Cardiac Risk Factor	Total N (%)	MI N (%)	Non-MI N (%)	p	Total N (%)	> 65 yrs. N (%)	≤ 65yrs. N (%)	p
Current Smoker	65/232 (28.0)	12 (23.4)	53 (28.5)	.745	65/238 (27.3)	16 (13.8)	49 (40.2)	**<.001**
Diabetes	70/273 (25.6)	16 (28.9)	54 (24.1)	.215	70/279 (25.1)	40 (31.3)	30 (19.9)	**.029**
Family History	83/210 (39.5)	17 (40.3)	66 (39.8)	.892	83/215 (38.6)	33 (31.1)	50 (45.9)	**.026**
Dyslipidemia	120/201 (59.7)	27 (62.5)	93 (58.9)	.641	122/206 (59.2)	63 (59.4)	59 (57.3)	.571
Hypertension	123/234 (52.6)	28 (27.6)	95 (51.1)	.369	125/239 (52.3)	71 (59.7)	54 (45.0)	**.023**

Table 7
Cardiac Risk Factors of Women Presenting to the Emergency Department by Age and Final Diagnosis

Cardiac Risk Factor	Total N (%)	MI N (%)	Non-MI N (%)	p	Total N (%)	> 65 yrs. N (%)	≤ 65yrs. N (%)	p
Current Smoker	23/141 (16.3)	3 (16.7)	20 (16.3)	.595	24/143 (16.8)	3 (4.6)	21 (26.9)	**<.001**
Diabetes	27/184 (14.7)	5 (20.8)	22 (13.8)	.360	27/187 (14.4)	20 (21.1)	7 (7.6)	**.009**
Family History	63/128 (49.2)	8 (44.4)	55 (50.0)	.662	63/129 (48.8)	29 (49.2)	34 (48.6)	.948
Dyslipidemia	70/117 (59.8)	8 (61.5)	62 (59.6)	.894	71/118 (60.2)	47 (74.6)	24 (43.6)	**.001**
Hypertension	85/145 (58.6)	20 (87.0)	65 (53.3)	**.003**	86/147 (58.5)	61 (75.3)	25 (37.9)	**<.001**

Medical History

Data on the medical history of patients in the sample is displayed in Tables 8 to 13. Examination of the data revealed that patients in the total sample, non-MI subgroup, as well as the gender exclusive subgroups who were over the age of 65 years, were more likely than their younger counterparts to report history of angina, CABG, PTCA, arthritis, thyroid disease, and CHF. In the MI subgroup patients over the age of 65 years were more likely to report a history of MI, arrhythmia, CVA, and renal insufficiency than were their younger counterparts.

A total of 28.1% (n = 139) of patients reported a history of myocardial infarction. Men were more likely than women to have had a MI previously in both the total sample ($\chi^2 = 16.456$, p = < .001) and the non-MI subgroup ($\chi^2 = 14.720$, p < .001). Patients over age 65 in all categories except the "women only" subgroup were more likely to report a

previous MI than those 65 years of age or younger. No statistically significant differences in medical history were noted on the basis of final diagnosis.

A history of angina (stable or unstable) was provided by 25.1% (n = 122) of the total sample. There were no statistically significant differences noted on the basis of gender, but patients with a final diagnosis other than MI were more likely than their MI counterparts to report a history of angina, ($\chi^2 = 5.232$, $p = 0.22$).

Coronary Artery Bypass Grafting (CABG) was reported by 13.9% (n = 69) of the total sample. In both the total sample ($\chi^2 = 11.192$, $p = .001$) and the non-MI subgroup ($\chi^2 = 14.743$, $p < .001$), men were more likely than women to report a history of CABG. Patients with a final diagnosis other than MI ($\chi^2 = 7.083$, $p = .008$), and men ($\chi^2 = 14.743$, $p < .001$) in particular, were more likely to give a history of CABG than those with a final diagnosis of MI.

The frequency of Percutaneous Transluminal Coronary Angioplasty (PTCA) was similar to CABG, with 13.7% (n = 68) of patients reporting a previous PTCA. Men in both the total sample ($\chi^2 = 10.667$, $p < .001$) and non-MI subgroup ($\chi^2 = 12.996$, $p < .001$) were more likely than women to have had a previous PTCA. In addition, patients in the total sample not diagnosed with an MI ($\chi^2 = 7.132$, $p = .008$), and men in particular ($\chi^2 = 10.626$, $p = .004$), were more likely to report a previous PTCA than those with a final diagnosis of MI.

Arthritis was the fifth most commonly reported medical condition, and was found to affect 12.7% (n = 63) of the sample. In contrast to the cardiovascular conditions discussed above, arthritis was reported by more women than men in both the total sample

($\chi 2 = 5.764$, $p = .016$) and the non-MI subgroup. No statistically significant differences were noted on the basis of final diagnosis.

A history of arrhythmia was given by 11.7% (n = 58) of the total sample (35 men and 23 women). There were no significant differences noted on the basis of gender or final diagnosis.

Thyroid disease was reported by 10.3% (n = 51) of the total sample. Like arthritis, thyroid disease was more commonly described by women than men, in both the total sample ($\chi^2 = 7.210$, $p = .007$) and the non-MI subgroup ($\chi^2 = 6.999$, $p = .008$). No significant differences were noted on the basis of final diagnosis.

Cerebrovascular accidents (stroke) were reported by 7.7% (n = 38) of patients. There were no significant differences on the basis of gender; however, patients in the total sample with a final diagnosis of MI ($\chi^2 = 11.248$, $p = .001$), as well as women with a final diagnosis of MI ($\chi^2 = 10.808$, $p = .002$), were significantly more likely to report a previous stroke than their non-MI counterparts.

A history of congestive heart failure (CHF) was provided by 6.9% (n = 34) of the total sample, with similar numbers of men (7.8%, n = 22) and women (5.6%, n = 12). There were no significant differences noted on the basis of gender or final diagnosis.

Renal insufficiency was reported by 6.7% (n = 33) of the total sample. Although there were no statistically significant gender related differences, patients with a final diagnosis of MI were more likely than their non–MI counterparts to report renal insufficiency. This was noted in the total sample ($\chi^2 = 24.158$, $p = < .001$), as well as in both men ($\chi^2 = 13.417$, $p = .001$) and women ($\chi^2 = 7.825$, $p = .008$). Renal failure was reported by 2.4% (n = 12) of patients. Of these, eight patients (six men and two women)

were on hemodialysis, with the remaining four on peritoneal dialysis. Women with a final diagnosis of MI were more likely to suffer from renal failure than their non-MI counterparts ($\chi^2 = 4.241$, $p = .038$).

A history of asthma was described by 4.4% ($n = 22$) of the total sample. Differences on the basis of gender were varied, with women in the total sample being more likely than men to report asthma ($\chi^2 = 3.941$, $p = .047$), while the reverse was true in the MI subgroup ($\chi^2 = 3.516$, $p = .034$).

Transient Ischemic Attacks (TIA) were reported by 2.0% ($n = 10$) of the total sample. As with previously cited vascular conditions, men in the total sample were more likely than women to have experienced a TIA ($\chi^2 = 3.296$, $p = .049$). When age was used as a comparator, patients over 65 years were more likely to report a previous TIA in the total sample ($\chi^2 = 5.235$, $p = .010$), the non-MI subgroup ($\chi^2 = 3.963$, $p = .028$), and the "men only" subgroup ($\chi^2 = 4.881$, $p = .015$).

Table 8
Medical History of Patients Presenting to the Emergency Department by Age and Gender

Medical History	Total (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
MI	139/495 (28.1)	99 (35.2)	40 (18.7)	**<.001**	93 (38.3)	46 (18.3)	**<.001**
Angina	122/486 (25.1)	73 (26.5)	49 (23.3)	.433	84 (35.3)	38 (15.3)	**<.001**
CABG	69/496 (13.9)	52 (18.6)	17 (8.9)	**.001**	49 (20.1)	20 (7.9)	**<.001**
PTCA	68/496 (13.7)	51 (18.1)	17 (7.9)	**.001**	47 (19.3)	21 (8.3)	**<.001**
Arthritis	63/496 (12.7)	27 (9.6)	36 (16.8)	**.016**	50 (20.5)	13 (5.2)	**<.001**
Arrhythmia	58/497 (11.7)	35 (12.4)	23 (10.7)	.556	40 (16.3)	18 (7.1)	**.001**
Thyroid disease	51/496 (10.3)	20 (7.2)	31 (14.5)	**.007**	38 (15.6)	13 (5.2)	**<.001**
CVA	38/496 (7.7)	24 (8.5)	14 (6.5)	.414	31 (12.7)	7 (2.8)	**<.001**
CHF	34/495 (6.9)	22 (7.8)	12 (5.6)	.333	30 (12.3)	4 (1.6)	**<.001**
Renal Insufficiency	33/496 (6.7)	20 (7.2)	13 (6.0)	.614	31 (13.1)	2 (0.8)	**.001**
Asthma	22/496 (4.4)	8 (2.8)	14 (6.5)	**.047**	7 (2.9)	15 (6.0)	.095
Renal Failure	12/496 (2.4)	9 (3.2)	3 (1.4)	.199	8 (3.3)	4 (1.6)	.220
TIA	10/496 (2.0)	9 (3.2)	1 (0.5)	**.049**	9 (3.7)	1 (0.4)	**.010**
CABG Waiting List	5/522 (1.0)	4 (1.3)	1 (0.5)	.294	1 (0.4)	4 (1.8)	.375

Table 9
Medical History of Patients Presenting to the Emergency Department by Final Diagnosis

Medical History	Total N	(%)	MI N (%)	Non MI N (%)	p
MI	137/487	(28.1)	23 (31.1)	114 (27.6)	.540
Angina	122/478	(25.5)	11 (14.9)	111 (27.5)	**.022**
CABG	67/488	(13.7)	3 (4.0)	64 (15.5)	**.008**
PTCA	68/487	(14.0)	3 (4.1)	65 (15.7)	**.008**
Arthritis	63/488	(12.9)	11 (14.7)	52 (12.6)	.622
Arrhythmia	57/489	(11.7)	9 (12.0)	48 (11.6)	.920
Thyroid	49/488	(10.0)	7 (9.3)	42 (10.2)	.825
CVA	38/488	(7.8)	13 (17.3)	25 (6.1)	**.001**
CHF	34/487	(8.8)	3 (4.1)	31 (7.5)	.283
Renal Insufficiency	33/476	(6.9)	15 (21.4)	18 (4.4)	**<.001**
Asthma	22/488	(4.5)	3 (4.0)	19 (4.6)	.818
Renal failure	12/488	(2.5)	5 (6.7)	7 (1.7)	**.001**
TIA	10/488	(2.1)	2 (2.7)	8 (1.9)	.682

Table 10
Medical History of Patients Presenting to the Emergency Department by Age and Gender (MI Subgroup)

Medical History	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
MI	23/74 (31.1)	17 (34.7)	6 (24.0)	.740	19 (40.4)	4 (14.8)	**.022**
Angina	11/74 (14.9)	8 (16.3)	3 (12.0)	.452	8 (17.0)	3 (11.1)	.736
CABG	3/75 (4.0)	1 (2.0)	2 (8.0)	.256	2 (4.2)	1 (3.7)	1.000
PTCA	3/74 (4.1)	2 (4.1)	1 (4.0)	1.000	3 (6.4)		.295
Arthritis	11/75 (14.7)	5 (10.0)	6 (24.0)	.164	10 (20.8)	1 (3.7)	.085
Arrhythmia	9/75 (12.0)	6 (12.0)	3 (12.0)	1.000	9 (18.8)		**.022**
Thyroid disease	7/75 (9.3)	5 (10.0)	2 (8.0)	1.000	6 (12.5)	1 (3.7)	.410
CVA	13/75 (17.3)	7 (14.0)	6 (24.0)	.338	12 (25.0)	1 (3.7)	**.025**
CHF	3/74 (4.1)	2 (4.1)	1 (4.0)	1.000	3 (6.4)		.295
Renal Insufficiency	15/70 (21.4)	10 (21.3)	5 (21.7)	1.000	15 (34.1)		**.001**
Asthma	3/75 (4.0)	3 (6.0)		**.034**	1 (2.1)	2 (7.4)	.293
Renal Failure	5/75 (6.7)	3 (6.0)	2 (8.0)	1.000	4 (8.3)	1 (3.7)	.648
TIA	2/75 (2.7)	2 (4.0)		.550	2 (4.2)		.533

Table 11
Medical History of Patients Presenting to the Emergency Department by Age and Gender
(Non MI Subgroup)

Medical History	Total N	(%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs N (%)	p
MI	114/413	(27.6)	80 (35.2)	34 (18.2)	**<.001**	73 (38.0)	41 (18.6)	**<.001**
Angina	111/404	(27.5)	65 (29.3)	46 (25.3)	.370	76 (40.1)	35 (16.1)	**<.001**
CABG	64/413	(15.5)	49 (21.6)	15 (8.1)	**<.001**	46 (24.0)	18 (8.1)	**<.001**
PTCA	65/413	(15.7)	49 (21.6)	16 (8.6)	**<.001**	44 (22.9)	21 (9.5)	**<.001**
Arthritis	52/413	(12.6)	22 (9.7)	30 (16.1)	**.050**	40 (20.8)	12 (5.4)	**<.001**
Arrhythmia	48/414	(11.6)	29 (12.8)	19 (10.2)	.408	30 (15.5)	18 (8.1)	**.019**
CVA	25/413	(6.1)	17 (7.5)	8 (4.3)	.176	19 (9.9)	6 (2.7)	**.002**
CHF	31/413	(7.3)	20 (8.8)	11 (5.9)	.226	27 (14.1)	4 (1.8)	**<.001**
Thyroid disease	42/413	(10.2)	15 (6.6)	27 (14.5)	**.008**	30 (15.6)	12 (5.4)	**.001**
Renal Insufficiency	18/406	(4.4)	10 (4.5)	8 (4.3)	.922	16 (8.5)	2 (0.9)	**<.001**
Asthma	19/413	(4.6)	8 (3.5)	11 (5.9)	.249	6 (3.1)	13 (5.9)	.182
Renal Failure	7/413	(1.7)	6 (2.6)	1 (0.5)	.135	4 (2.1)	3 (1.4)	.709
TIA	8/413	(1.9)	7 (3.1)	1 (0.5)	.078	7 (3.6)	1 (0.5)	**.028**

Table 12
Medical History of Men Presenting to the Emergency Department by Age and Final Diagnosis

Medical History	Total N (%)	MI N (%)	Non MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
MI	99/281 (35.2)	17 (34.7)	80 (35.2)	.942	68 (51.5)	31 (20.8)	**< .001**
Angina	73/276 (26.4)	8 (16.3)	65 (29.3)	.064	47 (35.9)	26 (17.9)	**.001**
CABG	52/282 (18.4)	1 (2.0)	49 (21.6)	**.001**	36 (27.1)	16 (10.7)	**< .001**
PTCA	51/281 (18.2)	2 (4.1)	49 (21.6)	**.004**	34 (25.8)	17 (11.4)	**.002**
Arthritis	27/282 (9.6)	5 (10.0)	22 (9.7)	1.000	21 (15.8)	6 (4.0)	**.001**
Arrhythmia	35/282 (12.4)	6 (12.0)	29 (12.8)	.881	22 (16.5)	13 (8.7)	**.047**
Thyroid	20/282 (7.1)	5 (10.0)	15 (6.6)	.375	15 (11.3)	5 (3.4)	**.010**
CVA	24/282 (8.5)	7 (14.0)	17 (7.5)	.163	19 (14.3)	5 (3.4)	**.001**
CHF	22/281 (7.8)	2 (4.1)	20 (8.8)	.387	19 (14.4)	3 (2.0)	**< .001**
Renal Insufficiency	20/273 (7.3)	10 (21.3)	10 (4.5)	**.001**	18 (14.2)	2 (1.4)	**< .001**
Asthma	8/282 (2.8)		8 (3.5)	.358	1 (0.8)	7 (4.7)	**.070**
Renal Failure	9/282 (3.2)	3 (6.0)	6 (2.6)	.209	6 (4.5)	3 (2.0)	.315
TIA	9/282 (3.2)	2 (4.0)	7 (3.1)	.667	8 (6.0)	1 (0.7)	**.015**

Table 13
Medical History of Women Presenting to the Emergency Department by Age and Final Diagnosis

Medical History	Total N (%)	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
MI	40/214 (18.7)	6 (24.0)	34 (18.2)	.586	25 (22.5)	15 (14.6)	.136
Angina	49/210 (23.3)	3 (12.0)	46 (25.3)	.143	37 (34.6)	12 (11.7)	**<.001**
CABG	17/214 (7.9)	2 (8.0)	15 (8.1)	1.000	13 (11.7)	4 (3.9)	**.034**
PTCA	17/214 (7.9)	1 (4.0)	16 (8.6)	.700	13 (11.7)	4 (3.9)	**.034**
Arthritis	25/211 (11.8)	6 (16.6)	19 (10.9)	.393	29 (26.1)	7 (6.8)	**<.001**
Arrhythmia	23/215 (10.7)	3 (12.9)	19 (10.2)	.730	18 (16.1)	5 (4.9)	**.008**
Thyroid	31/214 (14.5)	2 (8.0)	27 (14.5)	.541	23 (20.7)	8 (7.8)	**.007**
CVA	14/214 (6.5)	6 (24.0)	8 (4.3)	**.002**	12 (10.8)	2 (1.9)	**.009**
CHF	12/214 (5.6)	1 (4.0)	11 (5.9)	1.000	11 (9.9)	1 (1.0)	**.005**
Renal Insufficiency	13/211 (6.2)	5 (21.7)	8 (4.3)	**.008**	13 (11.9)		**< .001**
Asthma	14/214 (6.5)	3 (12.0)	11 (5.9)	.221	6 (5.4)	8 (7.8)	.485
Renal Failure	3/214 (1.4)	2 (8.0)	1 (0.5)	**.038**	2 (1.8)	1 (1.0)	1.000
TIA	1/214 (0.5)		1 (0.5)	1.000	1 (0.9)		1.000

Medications of Patients Presenting to the Emergency Department

Medications taken by patients on presentation to the Emergency Department are depicted in Tables 14 to 18. Aspirin was the most common medication in use, taken by 36.7% (n = 196) of the sample. It was trailed by beta-blockers (32.4%, n = 169), ACE Inhibitors (25.7%, n = 133), lipid lowering therapy (25.7%, n = 133), calcium channel blockers (18.8%, n = 98), nitrospray (18.2%, n = 95), vitamins or herbal supplements (16.9%, n = 88), and diuretics (16.7%, n = 87). The proportion of patients using analgesics, antibiotics, anti-arrhythmics, angiotensin II inhibitors, calcium channel

blockers, celebrex, coumadin, digoxin, diuretics, insulin, Plavix, nitro patch, nitro spray, and vitamins or herbal supplements was similar for both men and women. Men in the total sample were more likely than women to take aspirin ($\chi^2 = 8.684$, $p = .003$), ACE Inhibitors ($\chi^2 = 5.387$, $p = .020$), beta-blockers ($\chi^2 = 11.217$, $p = .001$), lipid lowering therapy ($\chi^2 = 9.824$, $p = .002$), and hypoglycemic medication ($\chi^2 = 7.046$, $p = .008$). Similarly, men in the non-MI subgroup were more likely than women to report taking aspirin ($\chi^2 = 7.956$, $p = .005$), ACE Inhibitors ($\chi^2 = 5.032$, $p = .025$), beta blockers ($\chi 2 = 12.123$, $p < .001$), lipid lowering agents ($\chi^2 = 9.518$, $p = .002$), and hypoglycemics ($\chi^2 = 5.802$, $p = .016$). Men in the non-MI subgroup were also more likely than women to be taking calcium channel blockers ($\chi^2 = 5.498$, $p = .019$). Women in the total sample were more likely than men to be taking antidepressants ($\chi^2 = 6.276$, $p = .012$), Ativan ($\chi^2 = 4.855$, $p = .028$), anxiolytics or sleeping pills ($\chi^2 = 5.483$, $p = .019$), Nitrong ($\chi^2 = 7.699$, $p = .006$), and non–steroidal anti-inflammatory drugs [NSAIDs] ($\chi^2 = 10.531$, $p = .001$) when they presented to the Emergency Department. Results were similar in the non-MI subgroup, with women again being more likely than men to be taking anti-depressants ($\chi^2 = 6.491$, $p = .011$), Nitrong ($\chi^2 = 5.792$, $p = .016$), and NSAIDS ($\chi^2 = 8.650$, $p = .003$). Women in the MI subgroup, were more likely than their male counterparts to be taking sleeping pills or anxiolytics other than Ativan ($\chi^2 = 9.248$, $p = .002$).

As was noted in the findings on medical history, age is a powerful influence on the health of individuals. When comparisons of age and medication usage were undertaken, it was determined that in the total sample and non-MI subgroup, as well as the "men only" and "women only" subgroups, patients over the age of 65 years were significantly more

likely to be taking medication than their younger counterparts. This relationship was noted for aspirin, ACE Inhibitors, calcium channel blockers, digoxin, lipid lowering therapy, nitropatch, and NSAIDs. Patients over 65 years of age in the MI subgroup as well as the other four previously mentioned groups, were more likely to be taking beta blockers and diuretics than those 65 years of age and younger. The following medications were taken more commonly by those over 65 years of age than their younger counterparts; anti-arrhythmics in the total sample (χ^2 = 8.647, p = .003), non-MI subgroup (χ^2 = 8.175, p = .004), and "women only" subgroup (χ^2 = 4.936, p = .019); Ativan in the total sample (χ^2 = 5.517, p = .019), non-MI subgroup (χ^2 = 6.874, p = .009) and "men only" subgroup (χ^2 = 6.015, p = .014); anxiolytics/sleeping pills in the total sample (χ^2 = 9.307, p = .002), non-MI subgroup (χ^2 = 4.838, p = .028), and "men only" subgroup (χ^2 = 5.114, p = .024); coumadin in the total sample (χ^2 = 16.327, p <.001), non-MI subgroup (χ^2 = 12.168, p < .001), and "women only" subgroup (χ^2 = 16.143, p < .001); hypoglycemics in the total sample (χ^2 = 5.637, p = .018), the non-MI subgroup (χ^2 = 6.802, p = .009), and the "men only" subgroup (χ^2 = 4.825, p = .028); insulin in the total sample (χ^2 = 4.111, p = .043) and non-MI subgroup (χ^2 = 5.056, p = .025); nitrospray in the total sample (χ^2 = 10.993, p = .001), non-MI subgroup (χ^2 = 15.628, p <.001) and "men only" subgroup (χ^2 = 14.077, p < .001); Nitrong in the total sample (χ^2 = 5.462, p = .019), in the non-MI subgroup (χ^2 = 5.534, p = .019) and the "women only" subgroup (χ^2 = 7.496, p = .006); and NSAIDs in the non-MI subgroup (χ^2 = 4.029, p = .045).

The only statistically significant situation in which patients 65 years of age or younger outnumbered their counterparts in the use of a specific medication, was with the use of antibiotics in the MI subgroup ($\chi^2 = 3.116$, $p = .042$).

There were only two statistically significant relationships noted on the basis of final diagnosis. Women with a final diagnosis of MI were more likely to be taking analgesics ($\chi^2 = 5.575$, $p = .016$) or sleeping pills/anxiolytics ($\chi^2 = 8.074$, $p = .005$) than their non-MI counterparts.

Table 14
Medications at Presentation to the Emergency Department by Age and Gender

	Total	Men	Women		> 65 yrs	≤65 yrs	
Medication	N (%)	N (%)	N (%)	p	N (%)	N (%)	p
Aspirin	191 (36.7)	126 (42.0)	65 (29.4)	**.003**	126 (51.6)	65 (23.9)	**<.001**
ACE Inhibitor	133 (25.7)	88 (29.3)	45 (20.6)	**.020**	86 (34.8)	47 (17.3)	**<.001**
Analgesic	41 (7.9)	21 (7.0)	20 (9.1)	.393	19 (7.6)	22 (8.1)	.846
Antiarrhythmic	20 (3.8)	10 (3.3)	10 (4.5)	.484	16 (6.4)	4 (1.5)	**.003**
Antibiotics	11 (2.1)	3 (1.0)	8 (3.6)	.061	5 (2.0)	6 (2.2)	.873
Antidepressant	57 (10.9)	24 (8.0)	33 (14.9)	**.012**	31 (12.5)	26 (9.6)	.291
Ativan	29 (5.6)	11 (3.7)	18 (8.1)	**.028**	20 (8.0)	9 (3.3)	**.019**
Angiotensin II Antagonist	11 (2.1)	5 (1.7)	6 (2.7)	.301	6 (2.4)	5 (1.8)	.650
Beta Blocker	169 (32.4)	115 (38.3)	54 (24.4)	**.001**	115 (46.2)	54 (19.9)	**<.001**
Calcium Channel.blocker	98 (18.8)	65 (21.7)	33 (14.9)	.052	64 (25.7)	34 (12.5)	**<.001**
Celebrex	33 (6.3)	22 (7.3)	11 (5.0)	.275	19 (7.6)	14 (5.2)	.245
CNS/Anxiolytics	48 (9.2)	20 (6.7)	28 (12.7)	**.019**	33 (13.3)	15 (5.5)	**.002**
Coumadin	41 (7.9)	22 (7.3)	19 (8.6)	.596	32 (12.9)	9 (3.3)	**<.001**
Digoxin	28 (5.4)	15 (4.7)	13 (5.9)	.659	24 (9.6)	4 (0.4)	**<.001**
Diuretic	87 (16.7)	46 (15.3)	41 (18.6)	.330	64 (25.8)	23 (8.5)	**<.001**
HRT	39 (17.7)		39 (17.7)		18 (16.1)	21 (19.3)	.533
Hypoglycemic	43 (8.3)	33 (11.0)	10 (4.5)	**.008**	28 (11.2)	15 (5.5)	**.018**
Insulin	20 (3.8)	13 (4.3)	7 (3.2)	.494	14 (5.6)	6 (2.2)	**.043**
Lipid lowering	133 (25.7)	92 (30.7)	41 (18.6)	**.002**	81 (32.5)	52 (19.1)	**<.001**
Plavix	11 (2.1)	6 (2.0)	5 (2.3)	.534	7 (2.8)	4 (0.4)	.288
Nitropatch	62 (11.9)	34 (11.3)	28 (12.7)	.642	49 (19.7)	13 (4.8)	**<.001**
Nitrospray	95 (18.2)	52 (17.3)	43 (19.5)	.535	60 (24.1)	35 (12.9)	**.001**
Nitrong	14 (2.7)	3 (1.0)	11 (5.0)	**.006**	11 (4.4)	4 (0.4)	**.019**
NSAIDs	26 (5.0)	7 (2.3)	19 (8.6)	**.001**	17 (6.8)	9 (3.3)	**.065**
Vitamins/herbals	88 (16.9)	50 (16.7)	38 (17.2)	.875	63 (25.3)	25 (9.2)	**<.001**

Table 15
Medications at Presentation to the Emergency Department by Age and Gender (MI Subgroup)

Medication	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Aspirin	22 (28.9)	17 (33.3)	5 (20.0)	.229	16 (32.7)	6 (22.2)	.246
ACE Inhibitor	19 (25.0)	15 (29.4)	4 (16.0)	.205	13 (26.5)	6 (22.2)	.678
Analgesic	13 (17.1)	7 (13.7)	6 (24.0)	.211	9 (18.4)	4 (14.8)	.478
Antiarrhythmic	2 (2.6)	2 (3.9)			2 (4.1)	1 (3.7)	.413
Antibiotics	3 (4.0)	1 (2.0)	2 (8.0)	.250		3 (11.1)	**.042**
Antidepressant	9 (11.8)	5 (6.6)	4 (16.0)	.332	6 (12.2)	3 (11.1)	.599
Ativan	5 (6.6)	2 (3.9)	3 (12.0)	.197	3 (6.1)	2 (7.4)	.587
Angiotensin II Antagonist	2 (2.6)		2 (8.0)		1 (2.0)	1 (3.7)	.587
Beta Blocker	20 (26.3)	14 (27.5)	6 (24.0)	.748	17 (34.7)	3 (11.1)	**.025**
Calcium channel blocker	18 (23.7)	11 (21.6)	7 (28.0)	.536	15 (30.6)	3 (11.1)	.056
Celebrex	7 (9.2)	5 (6.6)	2 (8.0)	.581	4 (8.2)	3 (11.1)	.482
CNS/Anxiolytics	10 (13.2)	2 (3.9)	8 (32.0)	**.002**	9 (18.4)	1 (3.7)	.067
Coumadin	6 (7.9)	4 (7.8)	2 (8.0)	.649	6 (12.2)		.064
Digoxin	5 (6.6)	3 (5.9)	2 (8.0)	.535	5 (10.2)		.103
Diuretic	16 (21.1)	9 (17.6)	7 (28.0)	.298	15 (30.6)	1 (3.7)	**.006**
Hypoglycemic	10 (13.2)	8 (15.7)	2 (8.0)	.293	6 (12.2)	4 (14.8)	.504
Insulin	5 (6.6)	5 (9.8)			3 (6.1)	2 (7.4)	.587
Lipid lowering	17 (22.4)	13 (25.5)	4 (16.0)	.351			
Nitropatch	5 (6.6)	2 (3.9)	3 (12.0)	.197	4 (8.2)	1 (3.7)	.413
Nitrospray	9 (11.8)	6 (11.8)	3 (12.0)	.623	5 (10.2)	4 (14.8)	.401
Nitrong	1 (1.3)		1 (4.0)		1 (2.0)		
NSAIDs	3 (4.0)	1 (2.0)	2 (8.0)	.250	2 (4.1)	1 (3.7)	.714
Vitamins/herbals	16 (21.1)	10 (19.6)	8 (32.0)	.659	13 (26.5)	3 (11.1)	.115

Table 16
Medications at Presentation to the Emergency Department by Age and Gender (Non - MI subgroup)

Medication	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs N (%)	p
Aspirin	163 (37.4)	105 (43.2)	58 (30.1)	**.005**	106 (54.1)	57 (23.8)	**<.001**
ACE Inhibitor	111 (25.5)	72 (29.6)	39 (20.2)	**.025**	70 (35.7)	41 (17.1)	**<.001**
Analgesic	27 (6.2)	13 (5.3)	14 (7.3)	.413	10 (5.1)	17 (7.1)	.393
Antiarrhythmic	18 (4.1)	10 (4.1)	8 (4.1)	.325	14 (7.1)	4 (1.7)	**.004**
Antibiotics	7 (1.6)	2 (0.8)	5 (2.6)	.142	4 (2.0)	3 (1.3)	.390
Antidepressant	47 (10.8)	18 (7.4)	29 (15.0)	**.011**	24 (12.2)	23 (9.6)	.373
Ativan	24 (5.5)	9 (3.7)	15 (7.8)	.064	17 (8.7)	7 (2.9)	**.009**
Angiotensin II Antagonist	9 (2.1)	5 (2.1)	4 (2.1)	.623	5 (2.6)	4 (1.7)	.376
Beta Blocker	147 (33.7)	99 (40.7)	48 (24.9)	**<.001**	97 (49.5)	50 (20.8)	**<.001**
Calcium channel blocker	80 (18.3)	54 (22.2)	26 (13.5)	**.019**	49 (25.0)	31 (12.9)	**.001**
Celebrex	25 (5.7)	16 (6.6)	9 (4.7)	.391	14 (7.1)	11 (4.6)	.253
CNS/Anxiolytics	37 (8.5)	18 (7.4)	19 (9.8)	.364	23 (11.7)	14 (5.8)	**.028**
Coumadin	34 (7.8)	18 (7.4)	16 (8.3)	.733	25 (12.8)	9 (3.8)	**<.001**
Digoxin	22 (5.0)	12 (4.9)	10 (5.2)	.908	18 (9.2)	4 (1.7)	**<.001**
Diuretic	71 (16.3)	37 (15.2)	34 (17.6)	.502	49 (25.0)	22 (9.2)	**<.001**
Hypoglycemic	33 (7.6)	25 (10.3)	8 (4.1)	**.016**	22 (11.2)	11 (4.6)	**.009**
Insulin	15 (3.4)	8 (3.3)	7 (3.6)	.849	11 (5.6)	4 (1.7)	**.025**
Lipid lowering	113 (25.9)	77 (31.7)	36 (18.7)	**.002**	65 (33.2)	48 (20.0)	**.002**
Plavix	11 (2.5)	6 (2.5)	5 (2.6)	.585	7 (3.6)	4 (1.7)	.207
Nitropatch	57 (13.1)	32 (13.2)	25 (13.0)	.947	45 (23.0)	12 (5.0)	**<.001**
Nitrospray	86 (19.7)	46 (18.9)	40 (20.7)	.640	55 (28.1)	31 (12.9)	**<.001**
Nitrong	13 (3.0)	3 (1.2)	10 (5.2)	**.016**	10 (5.1)	3 (1.3)	**.019**
NSAIDs	23 (5.3)	6 (2.5)	17 (8.8)	**.003**	15 (7.7)	8 (3.3)	**.045**
Vitamins/herbals	70 (16.1)	39 (16.0)	31 (16.1)	.997	48 (24.5)	22 (9.2)	**<.001**

Table 17
Medications on Presentation to the Emergency Department by Age and Final Diagnosis (Men)

Medication	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Aspirin	17 (38.3)	105 (43.2)	.193	85 (62.0)	41 (25.2)	**< .001**
ACE Inhibitor	15 (29.4)	72 (29.6)	.975	54 (39.4)	34 (20.9)	**< .001**
Analgesic	7 (13.7)	13 (5.3)	.058	9 (6.6)	12 (7.4)	.789
Anti-arrhythmic	2 (3.9)	10 (4.1)	.686	7 (5.1)	3 (1.8)	.195
Antibiotic	1 (2.0)	2 (0.8)	.437	1 (0.7)	2 (1.2)	1.000
Anti-depressant	5 (6.6)	18 (7.4)	.568	14 (10.2)	10 (6.1)	.194
Ativan	2 (3.9)	9 (3.7)	1.000	9 (6.6)	2 (1.2)	**.014**
Angiotensin II Antagonist		5 (2.1)	.591	2 (1.5)	3 (1.8)	1.000
Beta blocker	14 (27.5)	99 (40.7)	.076	78 (56.9)	37 (22.7)	**< .001**
Calcium channel blocker	11 (21.6)	21 (22.2)	.919	41 (29.9)	24 (14.7)	**.001**
Celebrex	5 (6.6)	16 (6.6)	.381	12 (8.8)	10 (6.2)	.385
CNS /Anxiolytics	2 (3.9)	18 (7.4)	.544	14 (10.2)	6 (3.7)	**.024**
Coumadin	4 (7.8)	18 (7.4)	1.000	14 (10.2)	8 (4.9)	.079
Digoxin	3 (5.9)	12 (4.9)	.730	13 (9.5)	2 (1.2)	**.001**
Diuretic	9 (17.6)	37 (15.2)	.665	36 (26.3)	10 (6.2)	**< .001**
Hypoglycemic	8 (15.7)	25 (10.3)	.267	21 (15.3)	12 (7.4)	**.028**
Insulin	5 (9.8)	8 (3.3)	.055	9 (6.6)	4 (2.5)	.081
Lipid lowering	13 (25.5)	77 (31.7)	.383	51 (37.2)	41 (25.2)	**.024**
Plavix		6 (2.5)		3 (2.2)	2 (1.2)	1.000
Nitropatch	2 (3.9)	32 (13.2)	.060	28 (20.4)	6 (3.7)	**< .001**
Nitrospray	6 (11.8)	46 (18.9)	.223	36 (26.3)	16 (9.8)	**< .001**
Nitrong		3 (1.2)		1 (0.7)	2 (1.2)	1.000
NSAID	1 (2.0)	6 (2.5)	1.000	4 (2.9)	3 (1.8)	.706
Vitamins/herbals	10 (19.6)	39 (16.0)	.535	38 (27.7)	12 (7.4)	**< .001**

Table 18
Medications on Presentation to the Emergency Department by Age and Final Diagnosis (Women)

Medication	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Aspirin	5 (20.0)	58 (30.1)	.297	41 (36.6)	24 (22.0)	**.017**
ACE Inhibitor	4 (16.0)	39 (29.6)	.792	32 (28.6)	13 (11.9)	**.002**
Analgesic	6 (24.0)	14 (7.3)	**.016**	10 (8.9)	10 (9.2)	1.000
Anti-arrhythmic		8 (4.1)		9 (8.0)	1 (0.9)	**.019**
Antibiotic	2 (8.0)	5 (2.6)	.185	4 (3.6)	4 (3.7)	1.000
Anti-depressant	4 (16.0)	29 (15.0)	1.000	17 (15.2)	16 (14.7)	1.000
Ativan	3 (12.0)	15 (7.8)	.442	11 (9.8)	7 (6.4)	.356
AT-II Antagonist	2 (8.0)	4 (2.1)	.142	4 (3.6)	2 (1.8)	.683
Beta blocker	6 (24.0)	48 (24.9)	.924	37 (33.0)	17 (15.6)	**.003**
Calcium channel blocker	7 (28.0)	26 (13.5)	.073	23 (20.5)	10 (9.2)	**.018**
Celebrex	2 (8.0)	9 (4.7)	.366	7 (6.3)	4 (3.7)	.378
CNS /Anxiolytics	8 (32.0)	19 (9.8)	**.005**	19 (17.0)	9 (8.3)	.052
Coumadin	2 (8.0)	16 (8.3)	1.000	18 (16.1)	1 (0.9)	**<.001**
Digoxin	2 (8.0)	10 (5.2)	.633	11 (9.8)	2 (1.8)	**.012**
Diuretic	7 (28.0)	34 (17.6)	.273	28 (25.0)	13 (11.9)	**.012**
HRT	4 (16.0)	35 (18.2)	1.000	18 (16.1)	21 (19.3)	.533
Hypoglycemic	2 (8.0)	8 (4.1)	.386	7 (6.3)	3 (2.8)	.333
Insulin		7 (3.6)		5 (4.5)	2 (1.8)	.446
Lipid lowering	4 (16.0)	36 (18.7)	1.000	30 (26.8)	11 (10.1)	**.001**
Plavix		5 (2.6)		4 (3.6)	1 (0.9)	.370
Nitropatch	3 (12.0)	25 (13.0)	1.000	21 (18.8)	7 (6.4)	**.006**
Nitrospray	3 (12.0)	40 (20.7)	.426	24 (21.4)	19 (17.4)	.453
Nitrong	1 (4.0)	10 (5.2)	1.000	10 (8.9)	1 (0.9)	**.006**
NSAID	2 (8.0)	17 (8.8)	1.000	13 (11.6)	6 (5.5)	.106
Vitamins/herbals	8 (32.0)	31 (16.1)	.393	25 (22.3)	13 (11.9)	**.041**

Symptom Presentation

Chief complaints of the 522 patients upon admission to the Emergency Department are presented in Tables 19 to 24. The most common chief complaint was non-specific chest pain, identified by 29.9% (n = 156) of patients, followed by left sided chest pain (19.9%, n = 104), retrosternal chest pain (18.8%, n = 98), and midsternal chest pain (11.5%, n = 60). Smaller numbers of patients presented with epigastric pain (5.4%, n = 28), dyspnea (4.6%, n = 24), right sided chest pain (2.5%, n = 13), left arm or shoulder pain (1.1%, n = 6), syncope or pre-syncope (n = 4), palpitations, (n = 4), or abdominal pain (n = 2). Other presentations (2.1%, n = 11) included chest tightness (no pain), a three week history of back pain, nausea, right arm pain, right arm ache, jaw pain,

a 3-4 week history of fatigue, dizziness, fatigue and confusion, bilateral arm pain, and concern regarding a diagnosis of hypertension.

Eighty (36.0%) women in the total sample presented with a complaint of non-specific chest pain compared to 76 (25.3%) men ($\chi^2 = 6.975$, $p = .008$) This finding was mirrored in the non-MI subgroup, in which 37.6% ($n = 73$) of women reported non-specific chest pain, compared with 23.0% ($n = 56$) of men ($\chi^2 = 11.028$, $p = .001$). In both the total sample ($\chi^2 = 7.348$, $p = .007$) and non-MI subgroup ($\chi^2 = 10.614$, $p = .001$) men were more likely than women to present with a complaint of left sided chest pain. When left sided chest pain was evaluated on the basis of final diagnosis in the "men only" subgroup, it was found to be more common in patients who did not suffer a MI ($\chi^2 = 11.421$, $p = .001$). Similarly, back pain as a presenting complaint was exclusive to men 65 years of age and younger, and was noted only in the non-MI subgroup. General malaise was exclusive to women over 65 years of age, and was significantly more common in women who suffered a MI ($\chi^2 = 13.429$, $p = .002$).

In contrast to previous comparisons on the basis of age which yielded numerous statistically significant differences, the only dissimilarity in symptom presentation was noted in the "women only" subgroup, in which women 65 years of age and younger were more likely than their older counterparts to present with "mid-sternal chest pain. ($\chi^2 = 4.776$, $p = .029$).

Symptom presentation comparisons on the basis of final diagnosis revealed few significant differences. Patients with a final diagnosis other than MI were more likely than their MI counterparts to complain of left-sided chest pain ($\chi^2 = 8.253$, $p = .004$) or dyspnea ($\chi^2 = 5.389$, $p = .016$). In contrast, patients with a final diagnosis of MI in the

total sample ($\chi^2 = 9.111$, $p = .005$), and "women only" subgroup ($\chi^2 = 13.429$, $p = .002$) were more likely to complain of general malaise than their non-MI equivalents.

Table 19
Chief Complaint on Presentation to the Emergency Department by Age and Gender

Chief Complaint	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Nonspecific chest pain	156 (29.9)	76 (25.3)	80 (36.0)	**.008**	82 (32.8)	74 (27.2)	.163
Left sided chest pain	104 (19.9)	72 (24.0)	32 (14.4)	**.007**	42 (16.8)	62 (22.8)	.087
Retrosternal chest pain	98 (18.8)	58 (19.3)	40 (18.0)	.704	50 (20.0)	48 (17.6)	.492
Midsternal chest pain	60 (11.5)	34 (11.3)	26 (11.7)	.893	28 (11.2)	32 (11.8)	.840
Epigastric pain	28 (5.4)	8 (6.0)	10 (4.5)	.453	10 (4.0)	18 (6.6)	.185
Dyspnea	24 (4.6)	17 (5.7)	7 (3.2)	.175	12 (4.8)	12 (4.4)	.832
Right sided chest pain	13 (2.5)	7 (2.3)	6 (2.7)	.789	7 (2.8)	6 (2.2)	.663
General malaise	6 (1.1)		6 (2.7)		6 (2.4)		
Left arm/shoulder pain	6 (1.1)	5 (1.7)	1 (0.5)	.247	2 (0.8)	4 (1.5)	.687
Back pain	5 (1.0)	5 (1.7)				5 (1.8)	
Palpitations	4 (0.8)	2 (0.7)	2 (0.9)	1.000	1 (0.4)	3 (1.1)	.532
Abdominal pain	2 (0.4)		2 (0.9)		2 (0.8)		.229
Other presentation	11 (2.1)	4 (1.3)	7 (3.2)	.160	5 (2.0)	6 (2.2)	.319

Table 20
Chief Complaint on Presentation to the Emergency Department by Final Diagnosis

Chief Complaint	Total N (%)	MI N (%)	Non-MI N (%)	p
Nonspecific chest pain	150 (29.2)	21 (27.6)	129 (29.5)	.738
Left sided chest pain	103 (20.1)	6 (7.9)	97 (22.2)	**.004**
Retrosternal chest pain	97 (18.9)	19 (25.0)	78 (17.8)	.142
Midsternal chest pain	60 (11.7)	6 (7.9)	54 (12.4)	.264
Epigastric pain	28 (5.5)	5 (6.6)	23 (5.3)	.588
Dyspnea	24 (4.7)	8 (10.5)	16 (36.6)	**.016**
Right sided chest pain	13 (2.5)	1 (1.3)	12 (2.7)	.703
General malaise	6 (1.2)	4 (5.3)	2 (0.5)	**.005**
Left arm/shoulder pain	6 (1.2)		6 (1.4)	
Back pain	5 (1.0)		5 (1.1)	
Other presentation	13 (2.5)	4 (5.3)	9 (2.1)	.111

Table 21
Chief Complaint on Presentation to the Emergency Department by Age and Gender (MI Subgroup)

Chief Complaint	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Nonspecific chest pain	21 (27.6)	15 (29.4)	6 (23.1)	.620	17 (34.7)	4 (14.8)	.064
Left sided chest pain	6 (7.9)	3 (5.9)	3 (11.5)	.306	9 (18.4)	10 (37.0)	.299
Retrosternal chest pain	19 (25.0)	15 (29.4)	4 (15.4)	.205	5 (10.2)	1 (3.7)	.072
Midsternal chest pain	6 (7.9)	4 (7.8)	2 (7.7)	.649	3 (6.1)	3 (11.1)	.360
Epigastric pain	5 (6.6)	4 (7.8)	1 (3.8)	.465	2 (4.1)	3 (11.1)	.237
Dyspnea	8 (10.5)	6 (11.8)	2 (7.7)	.474	4 (8.2)	4 (14.8)	.297
Right sided chest pain	1 (1.3)	1 (2.0)			1 (2.0)		
General malaise	4 (5.3)		4 (15.4)		4 (8.2)		
Abdominal pain	1 (1.3)		1 (3.8)		1 (2.0)		
Other presentation	4 (5.3)	3 (5.9)	1 (3.8)	.601	3 (6.1)	1 (3.7)	.553

Table 22
Chief Complaint on Presentation to the Emergency Department by Age and Gender (Non MI Subgroup)

Chief Complaint	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Nonspecific chest pain	129 (29.5)	56 (23.0)	73 (37.6)	**.001**	63 (32.0)	66 (27.5)	.307
Left sided chest pain	97 (22.2)	68 (28.0)	29 (14.9)	**.001**	37 (18.9)	60 (25.0)	.120
Retrosternal chest pain	78 (17.8)	43 (17.7)	35 (18.0)	.925	40 (20.3)	38 (15.6)	.225
Midsternal chest pain	54 (12.4)	30 (12.3)	24 (12.4)	.994	25 (12.7)	29 (12.1)	.848
Epigastric pain	23 (5.3)	14 (5.8)	9 (4.6)	.602	8 (4.1)	15 (6.3)	.308
Dyspnea	16 (3.7)	11 (4.5)	5 (2.6)	.281	8 (4.1)	8 (3.3)	.687
Right sided chest pain	12 (2.7)	6 (2.5)	6 (3.1)	.692	6 (3.0)	6 (2.5)	.728
General malaise	2 (0.5)		2 (1.0)		2 (1.0)		
Left arm/shoulder pain	6 (1.4)	5 (2.1)	1 (0.5)	.169	2 (1.0)	4 (1.7)	.439
Back pain	5 (1.1)	5 (2.1)				5 (2.1)	
Palpitations	3 (0.7)	1 (0.4)	2 (1.0)	.416	1 (0.5)	2 (0.8)	.574
Other presentation	9 (2.1)	2 (0.8)	7 (3.6)	.084	5 (2.5)	4 (1.7)	.379

Table 23
Chief Complaint on Presentation to the Emergency Department by Age and Final Diagnosis (Men)

Chief Complaint	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Non specific chest pain	15 (29.4)	56 (23.0)	.334	42 (30.7)	34 (20.9)	.052
Left sided chest pain	3 (5.9)	68 (28.0)	**.001**	26 (19.0)	46 (28.2)	.062
Retrosternal chest pain	15 (29.4)	43 (17.7)	.056	28 (20.4)	30 (18.4)	
Midsternal chest pain	4 (7.8)	30 (12.3)	.361	20 (14.6)	14 (8.6)	
Epigastric pain	4 (7.8)	14 (5.8)	.528	6 (4.4)	12 (7.4)	.279
Dyspnea	6 (11.8)	11 (4.5)	.090	8 (5.8)	9 (5.5)	.906
Right sided chest pain	1 (2.0)	6 (2.5)	1.000	3 (2.2)	4 (2.5)	1.000
Left arm/shoulder pain		5 (2.1)		2 (1.5)	3 (1.8)	1.000
Back pain		5 (2.1)			5 (3.1)	
Palpitations		1 (0.4)		1 (0.7)		
Right arm pain		1 (0.4)		1 (0.7)		
Other	3 (5.9)	2 (0.8)	**.038**	2 (1.5)	3 (1.8)	1.000

Table 24
Chief Complaint on Presentation to the Emergency Department by Age and Final Diagnosis (Women)

Chief Complaint	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Non specific chest pain	6 (23.1)	73 (37.6)	.182	40 (35.4)	40 (36.7)	.840
Left sided chest pain	3 (1.5)	29 (14.9)	1.000	16 (14.2)	16 (14.7)	1.000
Retrosternal chest pain	4 (15.4)	35 (18.0)	.802	22 (19.5)	18 (16.5)	.912
Midsternal chest pain	2 (7.7)	24 (12.4)	.746	8 (7.1)	18 (16.5)	**.029**
Epigastric pain	1 (3.8)	9 (4.6)	1.000	4 (3.5)	6 (5.5)	.533
Dyspnea	2 (7.7)	5 (2.6)	1.000	4 (3.5)	3 (2.8)	1.000
Right sided chest pain		6 (3.1)		4 (3.5)	2 (1.8)	.684
General malaise	4 (15.4)	2 (1.0)	**.002**	6 (5.3)		
Left arm/shoulder pain		1 (0.5)			1 (0.9)	
Abdominal pain	1 (3.8)			2 (1.8)		
Palpitations		2 (1.0)		1 (0.9)	1 (0.9)	1.000
Right arm pain	1 (4.0)			1 (0.9)		
Other	1 (3.8)	7 (3.6)	1.000	6 (5.3)	2 (1.8)	.281

Description of Chest Pain

Of the patients whose symptom presentation was some form of chest pain, 73.7% (n = 325) had a description of their pain documented on the Emergency Record; the results of which are presented in Tables 25 to 30. The most common expression, used by 19% (n = 64) of patients, was "heavy", while 13.9% (n = 47) described their pain as "sharp". "Tightness" (11.6%, n = 39), "crushing" (11.3%, n = 38), and "pressure" (10.7%, n = 36) were used less frequently, as were "squeezing", "aching", "dull", "burning", "indigestion", and "typical angina". Terms used by patients in the "other" category to describe their discomfort included "crowding", "jabbing", "band around chest", "tingling", "twinges", "spasms", "needle–like", "tearing", "gassy", "unlike typical angina", "gurgling in throat", "gripping", "rubbing sandpaper", and "discomfort".

Men and women were similar in their descriptions of chest pain, the only statistically significant differences occurring in the non-MI subgroup, where women were more likely than men to describe their pain as "heavy" ($\chi^2 = 4.029$, $p = .045$), and men were more likely than women to use the word "sharp" to describe their discomfort ($\chi^2 = 5.097$, $p = .024$). Some descriptions of chest pain used by patients in the MI subgroup were gender exclusive. Women did not use the terms "crushing", "pressure", or "typical angina" to qualify their pain, and men did not describe their pain as "indigestion" or "dull". There were no statistically significant gender differences in MI patients' descriptions of chest pain.

Patients over 65 years of age were more likely to use the term "crushing" than their counterparts who were 65 years of age or younger ($\chi^2 = 3.953$, $p = .047$), and those under

age of 65 years in the MI subgroup used "aching" more often than their older counterparts (χ^2 =3.569, p = .033).

Table 25
Description of Chest Pain on Presentation to the Emergency Department by Age and Gender

Description	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Heavy	64 (19.0)	30 (16.1)	34 (22.5)	.137	31 (12.4)	33 (12.4)	.588
Sharp	47 (13.9)	32 (17.2)	15 (9.9)	.055	18 (7.2)	29 (10.7)	.292
Tightness	39 (11.6)	23 (12.4)	16 (10.6)	.614	17 (6.8)	22 (8.1)	.809
Crushing	38 (11.3)	20 (10.7)	18 (11.9)	.736	23 (9.2)	15 (5.5)	**.047**
Pressure	36 (10.7)	16 (8.6)	20 (13.2)	.170	17 (6.8)	19 (7.0)	.816
Squeezing	26 (7.7)	12 (6.5)	14 (9.3)	.335	15 (6.0)	11 (4.0)	.190
Aching	22 (6.5)	15 (8.1)	7 (4.6)	.205	8 (3.2)	14 (5.1)	.379
Dull	18 (5.3)	9 (4.8)	9 (6.0)	.604	6 (2.4)	12 (4.4)	.291
Burning	18 (5.3)	8 (4.3)	10 (6.6)	.649	8 (3.2)	10 (3.7)	.933
Indigestion	9 (2.7)	5 (2.7)	4 (2.6)	.647	17 (6.8)	19 (7.0)	.350
Typical angina	4 (1.2)	4 (2.2)		.091	4 (1.6)		
Other	16 (4.7)	9 (4.8)	7 (4.6)	.931	3 (1.2)	13 (4.8)	.816

Table 26
Description of Chest Pain on Presentation to the Emergency Department by Final Diagnosis

Description	Total N (%)	MI N (%)	Non-MI N (%)	p
Heavy	64 (19.7)	10 (22.2)	54 (19.3)	.646
Sharp	46 (14.2)	4 (8.9)	42 (15.0)	.275
Tightness	37 (11.4)	7 (15.6)	30 (10.7)	.343
Crushing	37 (11.4)	3 (6.7)	34 (12.1)	.283
Pressure	33 (10.2)	2 (4.4)	31 (11.1)	.284
Squeezing	26 (8.0)	7 (15.6)	19 (6.8)	.068
Aching	21 (6.5)	5 (10.9)	16 (5.7)	.191
Dull	18 (5.5)	1 (2.2)	17 (6.1)	.486
Burning	18 (5.6)	3 (6.7)	15 (5.4)	.724
Indigestion	9 (2.8)	1 (2.2)	8 (2.9)	1.000
Typical Angina	4 (1.2)	1 (2.2)	3 (1.1)	.454
Other	16 (4.9)	2 (4.4)	14 (5.0)	1.000

Table 27
Description of Chest Pain on Presentation to the Emergency Department by Age and Gender (MI Subgroup)

Description	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Heavy	10 (22.2)	8 (26.6)	2 (13.3)	.269	7 (22.6)	3 (20.0)	.582
Sharp	4 (8.9)	2 (6.7)	2 (13.3)	.407	3 (9.7)	1 (6.7)	.606
Tightness	7 (15.6)	4 (13.3)	3 (20.0)	.429	4 (12.9)	3 (20.0)	.411
Crushing	3 (6.7)	3 (10.0)			3 (9.7)		
Pressure	2 (4.4)	2 (6.7)			2 (6.5)		
Squeezing	7 (15.6)	4 (13.3)	3 (20.0)	.429	6 (19.4)	1 (6.7)	.255
Aching	5 (10.9)	3 (9.7)	2 (13.3)	.532	1 (3.2)	4 (26.7)	**.033**
Dull	1 (2.2)		1 (6.7)			1 (6.7)	
Burning	3 (6.7)	2 (6.7)	1 (6.7)	.714	3 (9.7)		
Indigestion	1 (2.2)		1 (6.7)		1 (3.2)		
Typical angina	1 (2.2)	1 (3.3)			1 (3.2)		
Other	2 (4.4)	2 (6.7)				2 (20.0)	

Table 28
Description of Chest Pain on Presentation to the Emergency Department by Age and Gender (Non-MI Subgroup)

Description	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Heavy	54 (19.1)	22 (14.7)	32 (24.1)	**.045**	24 (20.9)	30 (18.2)	.575
Sharp	42 (14.8)	29 (19.3)	13 (9.8)	**.024**	15 (13.0)	27 (16.4)	.444
Tightness	30 (10.6)	17 (11.3)	13 (9.8)	.671	12 (10.4)	18 (10.9)	.900
Crushing	34 (12.0)	16 (10.7)	18 (13.5)	.459	19 (16.5)	15 (9.1)	.061
Pressure	31 (11.0)	13 (8.7)	18 (13.5)	.191	13 (11.3)	18 (10.9)	.917
Squeezing	19 (6.7)	8 (5.3)	11 (8.3)	.324	9 (7.8)	10 (6.1)	.563
Aching	16 (5.7)	12 (8.0)	4 (3.0)	.070	7 (6.1)	9 (5.5)	.864
Dull	17 (6.0)	11 (7.3)	6 (4.5)	.319	6 (5.2)	11 (6.7)	.617
Burning	15 (5.3)	7 (4.7)	8 (6.0)	.613	5 (4.3)	10 (6.1)	.531
Indigestion	8 (2.8)	5 (3.3)	3 (2.3)	.430	2 (1.7)	6 (3.6)	.290
Typical angina	3 (1.1)	3 (2.0)			3 (2.6)		
Other	14 (4.9)	7 (4.7)	7 (5.3)	.817	3 (2.6)	11 (6.7)	.617

Table 29
Description of Chest Pain on Presentation to the Emergency Department by Age and Final Diagnosis (Men)

Description	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Heavy	8 (26.6)	22 (14.7)	.120	15 (18.8)	15 (14.7)	.465
Sharp	2 (6.7)	29 (19.3)	.086	13 (16.3)	19 (18.6)	.676
Tight	4 (13.3)	17 (11.3)	.493	8 (10.0)	15 (14.7)	.343
Crushing	3 (10.0)	16 (10.7)	.593	11 (13.8)	9 (8.8)	.292
Pressure	2 (6.7)	13 (8.7)	.516	8 (10.0)	8 (7.8)	.610
Squeezing	4 (13.3)	8 (5.3)	.124	8 (10.0)	4 (3.9)	.101
Aching	3 (9.7)	12 (8.0)	.492	6 (7.5)	9 (8.8)	.675
Dull		11 (7.3)		5 (6.3)	6 (5.9)	1.000
Burning	2 (6.7)	7 (4.7)	.470	4 (5.0)	5 (4.9)	1.000
Indigestion		5 (3.3)		1 (1.3)	4 (3.9)	.387
Typical angina	1 (3.2)	3 (2.0)	.390	4 (5.0)		
Other	2 (6.7)	7 (4.7)	.470	1 (1.3)	8 (7.8)	.080

Table 30
Description of Chest Pain on Presentation to the Emergency Department by Age and Final Diagnosis (Women)

Description	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Heavy	2 (13.3)	32 (24.1)	.282	16 (23.2)	18 (22.0)	.856
Sharp	2 (13.3)	13 (9.8)	.466	5 (7.2)	10 (12.2)	.311
Tight	3 (20.0)	13 (9.8)	.209	9 (13.0)	7 (8.5)	.370
Crushing		18 (13.5)		12 (17.4)	6 (7.3)	.057
Pressure		18 (13.5)		9 (13.0)	11 (13.4)	.947
Squeezing	3 (20.0)	11 (8.3)	.154	7 (10.1)	7 (8.5)	.734
Aching	2 (13.3)	4 (3.0)	.113	2 (2.9)	5 (6.1)	.455
Dull	1 (6.7)	6 (4.5)	.534	1 (1.4)	6 (7.3)	.126
Burning	1 (6.7)	8 (6.0)	.629	4 (5.8)	5 (6.1)	1.000
Indigestion	1 (6.7)	3 (3.3)	.351	2 (2.9)	2 (2.4)	1.000
Other		7 (5.3)	.466	2 (2.9)	5 (6.1)	.455

Associated Symptoms

The majority of patients experienced more than one symptom in association with their chest pain, and these are depicted in Tables 31 to 36. Dyspnea was the most common symptom, reported by 44.2% (n = 205) of patients, followed by diaphoresis (34.8%, n = 155), and nausea (25.4%, n = 115). Dizziness (11.6%, n = 48), palpitations (9.5%, n = 38), weakness (6.0%, n = 24), vomiting (3.8%, n = 17), fatigue (2.8%, n = 11), and syncope (2.5%, n = 10) were reported less often than other symptoms. One hundred and forty-eight (30.6%) patients reported numerous atypical symptoms including flu-like illness, tingling fingers, blurred vision, facial numbness, lightheadedness, general malaise, decreased exercise tolerance, cough, diarrhea, and anxiety.

A gender-based comparison indicated that women in the total sample were more likely to report dizziness ($\chi^2 = 5.561$, $p = .018$), palpitations ($\chi^2 = 4.330$, $p = .037$), and atypical symptoms ($\chi^2 = 10.106$, $p = .001$) than were men. Women in the non-MI subgroup were more likely than their male counterparts to report atypical symptoms ($\chi^2 = 8.353$, $p = .004$), and women in the MI subgroup were more likely to report nausea ($\chi^2 = 4.064$, $p = .044$) than were men.

Patients older than 65 years of age were more likely to report vomiting ($\chi^2 = 7.658$, $p = .006$) and fatigue ($\chi^2 = 4.263$, $p = .039$) than were patients 65 years or younger. The report of weakness varied considerably in that it was more commonly experienced by men 65 years and younger ($\chi^2 = 8.610$, $p = .003$) than by their older counterparts. Conversely, women older than 65 years of age were more likely to complain of weakness than their younger equivalents ($\chi^2 = 7.648$, $p = .006$).

Patients with a final diagnosis of MI differed significantly from their non-MI cohorts on a number of variables. Patients with a final diagnosis other than MI were more likely to report experiencing palpitations ($\chi^2 = 5.169$, $p = .023$) than were their MI cohorts. In the total sample, patients with a final diagnosis of MI were more likely to report diaphoresis ($\chi^2 = 5.259$, $p = .022$), nausea ($\chi^2 = 7.645$, $p = .006$), vomiting ($\chi^2 = 8.775$, $p = .004$), and syncope ($\chi^2 = 6.673$, $p = .011$) than were those with a final diagnosis other than MI. Furthermore, men with a final diagnosis of MI were more likely than their non-MI counterparts to report diaphoresis ($\chi^2 = 6.840$, $p = .009$), vomiting ($\chi^2 = 5.060$, $p = .020$), and syncope ($\chi^2 = 5.892$, $p = .014$) Women with a final diagnosis of MI were more likely to report experiencing nausea ($\chi^2 = 11.569$, $p = .001$) and fatigue ($\chi^2 = 5.108$, $p = .025$) than women who did not experience a MI.

Table 31
Associated Symptoms on Presentation to the Emergency Department by Age and Gender

Symptoms	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤65 yrs. N (%)	p
Dyspnea	205 (44.2)	111 (41.9)	94 (46.5)	.370	96 (42.9)	109 (45.4)	.579
Diaphoresis	155 (34.8)	93 (36.8)	62 (32.1)	.309	79 (36.2)	76 (33.3)	.520
Nausea	115 (25.4)	64 (25.1)	51 (25.9)	.848	62 (28.1)	53 (22.9)	.212
Dizziness	48 (11.6)	20 (8.4)	28 (16.0)	**.018**	20 (9.7)	28 (13.5)	.233
Palpitations	38 (9.5)	16 (6.9)	22 (13.0)	**.037**	21 (10.2)	17 (8.6)	.580
Weakness	24 (6.0)	12 (5.2)	12 (7.2)	.417	12 (5.9)	12 (6.2)	.909
Vomiting	17 (3.8)	10 (4.0)	7 (3.6)	.850	14 (6.3)	3 (1.3)	**.006**
Fatigue	11 (2.8)	4 (1.8)	7 (4.2)	.215	9 (4.4)	2 (1.0)	**.039**
Syncope	10 (2.5)	6 (2.6)	4 (2.4)	1.000	6 (2.8)	4 (2.1)	.559
Other	149 (30.3)	68 (24.5)	81 (37.9)	**.001**	66 (27.9)	83 (32.7)	.245

Table 32
Associated Symptoms on Presentation to the Emergency Department by Final Diagnosis

Symptoms	Total N (%)	MI N (%)	Non-MI N (%)	p
Dyspnea	202 (44.3)	27 (41.5)	175 (44.8)	.629
Diaphoresis	154 (35.2)	31 (47.7)	123 (33.0)	**.022**
Nausea	114 (25.7)	26 (39.4)	88 (23.3)	**.006**
Dizziness	48 (11.8)	3 (4.8)	45 (13.1)	.059
Palpitations	38 (9.6)	1 (1.7)	37 (11.1)	**.023**
Weakness	24 (6.2)	7 (11.5)	17 (5.2)	.078
Vomiting	16 (3.6)	7 (11.5)	9 (2.7)	**.004**
Fatigue	11 (2.8)	4 (6.6)	7 (2.1)	.077
Syncope	10 (2.6)	5 (8.2)	8 (2.4)	**.011**
Other	148 (30.6)	22 (31.9)	126 (31.4)	.809

Table 33
Associated Symptoms on Presentation to the Emergency Department by Age and Gender (MI Subgroup)

Symptoms	Total N (%)	Male N (%)	Female N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Dyspnea	27 (41.6)	16 (34.8)	11 (57.9)	.085	18 (39.1)	10 (52.6)	.540
Diaphoresis	31 (47.7)	25 (54.3)	6 (31.6)	.095	21 (46.7)	10 (50.0)	.804
Nausea	26 (40.0)	14 (30.4)	12 (63.2)	**.044**	20 (43.5)	6 (30.0)	.303
Dizziness	3 (4.6)	1 (2.2)	2 (10.5)	.214	1 (2.3)	2 (10.0)	.234
Palpitations	1 (1.5)		1 (5.3)		1 (2.2)		
Weakness	7 (10.8)	4 (8.7)	3 (15.8)	.299	3 (7.0)	4 (22.2)	.106
Vomiting	7 (10.8)	5 (10.9)	2 (10.5)	.633	6 (13.0)	1 (5.3)	.333
Fatigue	4 (6.2)	1 (2.2)	3 (15.8)	.062	4 (8.7)		
Syncope	5 (7.7)	4 (9.1)	1 (5.9)	.570	4 (8.7)	1 (5.0)	.535
Other	22 (33.8)	12 (26.1)	10 (52.7)	.098	15 (33.3)	7 (35.0)	.864

Table 34
Associated Symptoms on Presentation to the Emergency Department by Age and Gender (Non-MI Subgroup)

Symptoms	Total N (%)	Men N (%)	Women N (%)	p	> 65 yrs. N (%)	≤ 65 yrs N (%)	p
Dyspnea	175 (44.8)	94 (44.5)	81 (45.0)	.929	76 (43.7)	99 (45.6)	.701
Diaphoresis	123 (33.0)	68 (33.7)	55 (32.2)	.759	57 (33.7)	66 (32.4)	.779
Nausea	88 (23.3)	49 (23.9)	39 (22.5)	.755	42 (24.6)	46 (22.2)	.592
Dizziness	45 (13.1)	19 (10.0)	26 (16.9)	.062	19 (11.9)	26 (14.1)	.551
Palpitations	37 (11.1)	16 (8.7)	21 (14.0)	.124	20 (12.6)	17 (9.7)	.405
Weakness	17 (5.2)	8 (4.4)	9 (6.1)	.489	9 (5.8)	8 (4.7)	.648
Vomiting	9 (2.4)	5 (2.5)	4 (2.3)	.605	7 (4.1)	2 (1.0)	.052
Fatigue	7 (2.1)	3 (1.7)	4 (2.7)	.393	5 (3.2)	2 (1.2)	.186
Syncope	5 (1.5)	2 (1.1)	3 (2.0)	.403	2 (1.3)	3 (1.7)	.552
Other	126 (30.4)	55 (24.4)	71 (37.6)	**.004**	51 (27.6)	75 (32.8)	.254

Table 35
Associated Symptoms on Presentation to the Emergency Department by Age and Final Diagnosis (Men)

Symptoms	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Dyspnea	16 (34.8)	94 (44.5)	.225	52 (42.6)	59 (42.1)	.937
Diaphoresis	25 (54.3)	68 (33.7)	**.009**	48 (40.3)	45 (33.6)	.266
Nausea	14 (30.4)	49 (23.9)	.313	31 (25.8)	33 (24.4)	.798
Dizziness	1 (2.2)	119 (10.0)	.077	6 (5.3)	14 (11.2)	.102
Palpitations		16 (8.7)	.046	9 (7.8)	7 (5.9)	.568
Weakness	4 (8.7)	8 (4.4)	.189	1 (0.9)	11 (9.5)	**.003**
Vomiting	5 (10.9)	5 (2.5)	**.020**	7 (5.8)	3 (2.3)	.199
Fatigue	1 (2.2)	3 (1.7)	.586	2 (1.8)	2 (1.7)	1.000
Syncope	4 (9.1)	2 (1.1)	**.014**	4 (3.7)	2 (1.7)	.440
Other	12 (26.1)	55 (24.4)	.875	28 (21.9)	40 (26.8)	.338

Table 36
Associated Symptoms on Presentation to the Emergency Department by Age and Final Diagnosis (Women)

Symptoms	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Dyspnea	11 (57.9)	81 (45.0)	.284	44 (43.1)	50 (50.0)	.328
Diaphoresis	6 (31.6)	55 (32.2)	.591	31 (31.3)	31 (33.0)	.804
Nausea	12 (63.2)	39 (22.5)	**.001**	31 (31.3)	20 (20.8)	.114
Dizziness	2 (10.5)	26 (16.9)	.373	14 (15.1)	14 (16.9)	.743
Palpitations	1 (5.3)	21 (14.0)	.341	12 (13.3)	10 (12.7)	.896
Weakness	3 (15.8)	9 (6.1)	.113	11 (12.4)	1 (1.3)	**.006**
Vomiting	2 (10.5)	4 (2.3)	.121	7 (6.9)		
Fatigue	3 (15.8)	4 (2.7)	**.025**	7 (6.9)		
Syncope	1 (5.9)	3 (2.0)	.357	2 (2.2)	2 (2.6)	1.000
Other	10 (52.7)	71 (37.6)	.471	38 (34.9)	43 (41.0)	.358

Radiation of Pain

Radiation of pain to the left arm was reported by 35.9% (n = 138) of patients, while 14.3% (n = 55) and 14.1% (n = 54) reported back pain or neck pain respectively. Right arm pain was reported by 11.7% (n = 45), left shoulder pain, by 8.9% (n = 34), followed closely by jaw pain with 8.1% (n = 31). Throat pain was reported by 2.9% (n = 11) of the sample and pain in both shoulders by 2.6% (n =11). Within the MI subgroup, both men (42.9%, n = 15) and women (43.8%, n = 7) reported radiation of pain to the left arm most often. Men also reported pain in the right arm (20.0%, n = 7) and jaw or back (11.4%, n = 4) more frequently than other locations, while women were more likely to experience pain in the back or neck (18.8%, n = 3). Men in the non-MI subgroup reported radiation to the left arm (37.6%, n = 68) most often, followed by the back (10.5%, n = 19), neck (9.9%, n = 18) and right arm or left shoulder (8.2%, n = 15). Women also reported radiation of pain to the left arm most often (32.4%, n = 47), followed by neck (20.7%, n = 30), back (17.9%, n = 26), and right arm (14.5%, n = 21).

The only statistically significant gender difference in radiation of pain was women were more likely than men to experience neck pain, both in the total sample ($\chi^2 = 8.697$, $p = .003$) and in the non-MI subgroup ($\chi^2 = 7.403$, $p = .007$).

Patients 65 years of age or younger were more likely to report pain radiating to the left shoulder in the total sample ($\chi^2 = 8.522$, $p = .004$) and non-MI subgroup ($\chi^2 = 8.402$, $p = .004$), than were their older counterparts. They also reported pain radiating to both shoulders more often in both the total sample ($\chi^2 = 6.582$, $p = .010$) and non-MI subgroup ($\chi^2 = 4.474$, $p = .026$). Conversely, patients over the age of 65 in both the total sample ($\chi^2 = 5.942$, $p = .015$) and non-MI subgroup ($\chi^2 = 7.707$, $p = .006$) were more likely to

describe right arm pain than were their younger counterparts. This finding extended to women ($\chi^2 = 6.284$, $p = .012$), but not to men.

There were no statistically significant differences in radiation of pain based on final diagnosis.

Table 37
Radiation of Chest Pain on Presentation to the Emergency Department by Age and Gender

	Total	Men	Women		> 65 yrs.	≤ 65 yrs.	
Location	N (%)	N (%)	N (%)	p	N (%)	N (%)	p
Left arm	138 (35.9)	84 (38.2)	54 (32.9)	.288	67 (36.8)	71 (35.2)	.734
Back	55 (14.3)	25 (11.4)	30 (18.3)	.055	28 (15.4)	27 (13.4)	.573
Neck	54 (14.1)	21 (9.6)	33 (20.1)	**.003**	23 (12.6)	16 (7.9)	.446
Right arm	45 (11.7)	22 (10.0)	23 (14.1)	.211	29 (15.9)	16 (7.9)	**.015**
Left shoulder	34 (8.9)	17 (7.7)	17 (10.4)	1.000	8 (4.4)	26 (12.9)	**.004**
Jaw	31 (8.1)	17 (7.7)	14 (8.5)	.773	19 (10.4)	12 (5.9)	.106
Both shoulders	11 (2.9)	4 (1.8)	7 (4.2)	.217	1 (0.6)	10 (4.9)	**.010**
Throat	11 (2.9)	6 (2.7)	5 (3.0)	.852	5 (2.8)	6 (3.0)	.896

Table 38
Radiation of Chest Pain on Presentation to the Emergency Department by Final Diagnosis

	Total	MI	Non-MI	
Location	N (%)	N (%)	N (%)	p
Left arm	137 (36.3)	22 (43.1)	115 (35.3)	.278
Back	47 (12.7)	7 (14.3)	40 (12.5)	.721
Neck	54 (14.3)	6 (11.8)	48 (14.7)	.575
Right arm	45 (11.9)	9 (18.0)	36 (11.0)	.156
Left shoulder	34 (9.0)	4 (7.8)	30 (9.2)	1.000
Jaw	31 (8.2)	5 (9.8)	26 (8.0)	.590
Bilateral shoulders	11 (2.9)		11 (3.4)	
Throat	11 (2.9)	1 (2.0)	10 (3.1)	1.000

Table 39
Radiation of Chest Pain on Presentation to the Emergency Department by Age and Gender (MI Subgroup)

	Total	Male	Female		> 65 yrs.	≤ 65 yrs.	
Location	N (%)	N (%)	N (%)	p	N (%)	N (%)	p
Left arm	22 (43.1)	15 (42.9)	7 (43.8)	.952	13 (40.6)	9 (47.4)	.428
Back	9 (17.6)	4 (11.4)	3 (18.8)	.412	4 (12.5)	3 (15.8)	.561
Neck	6 (11.8)	3 (8.6)	3 (18.8)	.273	4 (12.5)	2 (10.5)	.604
Right arm	9 (18.0)	7 (20.0)	2 (13.3)	.451	5 (15.6)	4 (21.1)	.413
Left shoulder	4 (7.8)	2 (5.7)	2 (13.3)	.371	2 (6.3)	2 (10.5)	.479
Jaw	5 (9.8)	4 (11.4)	1 (6.3)	.491	3 (9.4)	2 (10.5)	.623
Throat	1 (2.0)	1 (2.9)			1 (3.1)		

Table 40
Radiation of Chest Pain upon Presentation to the Emergency Department by Age and Gender (Non MI Subgroup)

Location	Total N (%)	Male N (%)	Female N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Left arm	115 (35.3)	68 (37.6)	47 (32.4)	.333	54 (36.7)	61 (34.1)	.617
Back	40 (12.3)	19 (10.5)	26 (17.9)	.053	19 (12.9)	21 (11.7)	.720
Neck	48 (14.7)	18 (9.9)	30 (20.7)	**.007**	19 (12.9)	29 (16.2)	.406
Right arm	36 (11.0)	15 (8.2)	21 (14.5)	.073	24 (16.3)	12 (6.7)	**.006**
Left shoulder	30 (9.2)	15 (8.3)	15 (10.3)	.523	6 (4.1)	24 (13.4)	**.004**
Jaw	26 (8.0)	13 (7.2)	13 (9.0)	.555	16 (10.9)	10 (5.6)	.079
Both shoulders	11 (3.4)	4 (2.2)	7 (4.8)	.161	1 (0.7)	10 (5.5)	**.013**
Throat	10 (3.1)	5 (2.8)	5 (3.4)	.482	4 (2.7)	6 (3.6)	.502

Table 41
Radiation of Chest Pain on Presentation to the Emergency Department by Age and Final Diagnosis (Men)

Location	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Left arm	15 (42.9)	68 (32.4)	.556	41 (40.6)	43 (36.1)	.497
Back	4 (11.4)	19 (17.9)	.526	10 (10.3)	10 (8.4)	.645
Neck	3 (8.6)	18 (20.7)		11 (10.9)	10 (8.4)	.531
Right arm	7 (20.0)	15 (14.5)	.059	12 (11.9)	10 (8.4)	.380
Left shoulder	2 (5.7)	15 (10.3)		3 (3.0)	14 (11.8)	**.015**
Jaw	4 (11.4)	13 (9.0)	.489	11 (10.9)	6 (5.0)	.105
Bilateral shoulders		4 (4.8)			4 (3.4)	.127
Throat	1 (2.9)	5 (3.4)		2 (2.0)	4 (3.4)	.690

Table 42
Radiation of Chest Pain on Presentation to the Emergency Department by Age and Final Diagnosis (Women)

Location	MI N (%)	Non-MI N (%)	p	> 65 yrs. N (%)	≤ 65 yrs. N (%)	p
Left arm	7 (43.8)	47 (32.4)	.362	26 (32.1)	28 (33.7)	.824
Back	3 (18.8)	26 (17.9)	.537	13 (16.3)	14 (17.3)	.861
Neck	3 (18.8)	30 (20.7)		12 (14.8)	21 (25.3)	.094
Right arm	2 (13.3)	21 (14.5)		17 (21.0)	6 (7.2)	**.012**
Left shoulder	2 (13.3)	15 (10.3)	.678	5 (6.2)	12 (14.5)	.082
Jaw	1 (6.3)	13 (9.0)		8 (9.9)	6 (7.2)	.544
Bilateral shoulders		7 (4.8)		1 (1.2)	6 (7.2)	.117
Throat		5 (3.4)		3 (3.7)	2 (2.4)	.680

Time to Treatment

Time to treatment encompasses the period of time from the onset of symptoms until the patient receives definitive treatment in the Emergency Department. This period is further subdivided into the Decision Phase (the time from onset of symptoms until the patient decides to seek medical attention), Transit Phase (the time from the decision to seek medical attention to hospital arrival), and Treatment Phase (hospital arrival to treatment).

Presentation Time

Presentation time encompasses the decision and transit phases, that is, the period of time from the onset of symptoms to arrival in the Emergency Department. Information on presentation time was available for 66.5 % (n = 347) of patients in the sample and is displayed in Tables 43 to 54.

Age and Gender. Men (n = 198) took an average of 252.72 ± 283.78 minutes to present to the Emergency Department, while women (n = 149) were somewhat quicker at 221.30 ± 251.50 minutes. The mean presentation time for patients with a final diagnosis of MI (n = 58) was 278.09 ± 335.84 minutes with a median time of 154 minutes. Results were similar for those who did not have MI as their final diagnosis (n = 282), with a mean presentation time of 232.51 ± 256.87 minutes and median time of 130 minutes. Age made little difference in arrival time, with patients over the age of 65 years (n = 174) taking a mean of 235.02 ± 241.67 minutes to arrive at the hospital, compared with 243.46 ± 297.28 minutes for their younger counterparts (n = 173). The mean presentation time for men (n = 40) in the MI subgroup was 290.02 ± 389.782 minutes compared to 251.56 ± 168.96 minutes for women (n = 18). When gender exclusive groups were compared in

the basis of final diagnosis, both men and women with a final diagnosis of MI took longer to present to hospital than their non-MI counterparts. When the same gender exclusive groups were assessed using age as a comparator, men over the age of 65 years presented more quickly than men 65 years of age or younger, while the reverse was true in women, with women 65 years of age and younger presenting more quickly than their older counterparts. None of the differences in presentation time were statistically significant.

Marital Status. Marital status did not significantly influence presentation times, as average presentation times for all 4 categories were within 27 minutes of one another. Married patients (n = 227) presented most quickly at an average of 230.39 minutes, followed by widowed (n = 54) at 246.33 minutes, single (n = 34) at 251.50 minutes, and finally divorced (n = 15) at 257.20 minutes. Comparison of presentation time on the basis of martial status revealed that married, single or widowed women presented to hospital more quickly than their male counterparts. Only in the "divorced" category, did men present to hospital more quickly than did women. Although this pattern was consistent across the total sample, as well as the MI and non-MI subgroups, none of the differences were statistically significant. Divorced men (n= 4) presented most quickly at 145.75 ± 99.46 minutes, followed by married men (n= 149) at 246.79 ± 293.37 minutes, single men (n = 20) at 276.00 ± 259.46 minutes, and finally widowers (n = 15) at 280.67 ± 306.34 minutes. Married women (n = 78) presented most quickly at 199.06 ± 241.16 minutes, followed by single women (n = 14) at 216.50 ± 284.03 minutes, widows (n = 39) at 233.13 ± 215.12 minutes, and finally divorced women at 297.73 ± 342.68 minutes. When presentation times and marital status were compared on the basis of age,

patients 65 years of age and younger presented more quickly if they were single, widowed or divorced, while married people over 65 years, presented earlier than their younger counterparts. Only in the widowed category was the difference statistically significant ($t = 4.954$, $p < .001$). When gender exclusive groups were examined, married men over 65 years of age presented sooner than those 65 years or less, while younger singles arrived at the ED more rapidly than their older counterparts. Women younger than 65 years of age presented to hospital more quickly than their older counterparts in all marital status categories, but none of the results were statistically significant.

Day of the Week. Overall, patients presented more quickly during the week ($M = 218.36 \pm 267.94$ minutes), than on the weekend ($M = 283.00 \pm 271.80$ minutes) ($t = 2.077$, $p = .038$). Comparisons on the basis of gender revealed that women presented more quickly than men on the weekend in the total sample ($t = 2.889$, $p = .005$) and in the non-MI subgroup ($t = 2.441$, $p = .017$). Men in the MI subgroup presented more quickly than women regardless of the day of the week, but this finding was not statistically significant. Age and final diagnosis were not found to significantly influence presentation time.

Time of Day .Data from time of onset of symptoms was grouped into four time periods; 0001-0600, 0601-1200, 1201-1800, and 1801-2400 hours. Similar numbers of patients reported symptoms beginning in the 0001-0600 ($n = 71$), 1201-1800 ($n = 77$), and 1801-2400 ($n = 77$) time periods. The greatest number of patients reported symptoms commencing between 0601 and 1200 ($n = 122$). Gender comparisons found men and women to be similar in their presentation times during each period except 0601-1200, in which women in both the total sample ($t = 3.121$, $p = .002$) and the non-MI subgroup

(t = 3.105, p = .003) presented more quickly than their male counterparts. No other significant gender differences were present. Within the MI subgroup, patients 65 years of age or younger were noted to present more quickly (M = 45.00 ± 15.56 minutes) than their older counterparts (M = 230.00 ± 134.40 minutes) during the 1201-1800 time period (t = 3.559, p = .010). Final diagnosis was not found to significantly influence presentation time in any of the four time periods.

Cardiac Risk Factors. The effect of cardiac risk factors on presentation time was examined on the basis of age, gender and final diagnosis, and no statistically significant differences were found. This finding was consistent across all five groups (total sample, MI subgroup, non-MI subgroup, "men only" and "women only" subgroups) Analysis of the entire sample revealed that on average, patients with cardiac risk factors took longer to present to hospital than those without. The difference was only statistically significant in diabetics (n = 66), who took an average of 300.36 ± 337.84 minutes to reach hospital, compared with non-diabetics who took 225.50 ± 251.89 minutes (t = 1.987, p = .048).

Medical History. Presentation times were calculated in the presence of a history of angina, MI, PTCA, CABG, CVA, TIA, CHF, renal insufficiency, renal failure, and arrhythmia, however, the effect of medical history on presentation time was found to be less significant than anticipated. A history of CVA was found to be most influential, whereby patients 65 years of age or younger in the total sample (t = 2.443, p = .024) and "women only" group (t = 2.598, p = .036) arrived at the hospital more quickly than their older counterparts. In the MI subgroup, men with a history of CVA presented nearly four times faster than women with a similar history (t = 6.619, p < .001). Finally, in the "men only" group, patients with a history of CVA and a final diagnosis of MI presented more

quickly than those whose final diagnosis was not MI (t = 2.975, p = .008). Patients with a history of arrhythmia who were 65 years of age or less, presented more quickly than those over the age of 65 years in both the total sample (t = 2.891, p = .007) and in the non-MI subgroup (t = 2.548, p = .019). Men 65 years of age or less with a history of angina arrived a hospital more quickly than did their older counterparts (t = 2.679, p = .010). Women with a final diagnosis other than MI and a history of CABG surgery presented to hospital more quickly than their counterparts with a final diagnosis of MI (t = 3.848, p = .002).

Chief Complaint. Patients with a chief complaint of mid-sternal chest pain presented most quickly (167.00 ± 151.68 min.), followed by right sided chest pain (187.56 ± 248.3 min.), general malaise (192.00. ± 101.82 min.), other presentations (219.50 ± 211.205 min.), non-specific chest pain (220.03 ± 247.13), dyspnea (227.31 ± 285.97), epigastric pain (232.35 ± 297.13 min.), left sided chest pain (247.97 ± 239.27), back pain (258.25 ± 281.28 min.), left arm or shoulder pain (259.00 ± 212.62), abdominal pain (260.50 ± 166.17), retrosternal chest pain (310.32 ± 375.61), palpitations (314.67 ± 412.41), and finally right arm pain (395.50 ± 420.73 min.). The MI subgroup presented quite differently, with complaints of right sided chest pain presenting most quickly, followed by dyspnea, other presentations, midsternal chest pain, left sided chest pain, general malaise, non-specific chest pain, retrosternal chest pain, and finally epigastric pain.

Description of Chest Pain. Men with non-specific chest pain in the MI subgroup took an average of 195.57 ± 140.82 minutes to present to hospital compared to women, who took twice that long (M = 396.80 ± 100.438 min.) (t = 2.917, p = .010). Women with a presentation classified as "other" in the non-MI subgroup arrived at hospital more quickly

than their male counterparts (t = 6.963, p = .002). Analysis on the basis of age revealed patients aged 65 years or younger with a chief complaint of midsternal chest pain presented more quickly than their older counterparts in the total sample (t = 2.203, p = .036). In the non-MI subgroup, patients with a chief complaint classified as "other" presented more quickly if they were older than 65 years of age (t= 6.963, p = .002). In the "women only" subgroup, those whose final diagnosis was not MI, presenting with non-specific chest pain, arrived at hospital earlier than patients who did receive a final diagnosis of MI (t = 2.935, p = .005).

Associated Symptoms. Of the various symptoms experienced in conjunction with the chief complaint, weakness had the most significant effect on presentation time, particularly in relation to patients 65 years of age and younger. In the total sample (t = 2.435, p = .038), MI subgroup (t = 4.190, p = .014), and "men only" subgroup (t = 7.338, p < .001), those 65 years and younger presented to the hospital significantly faster than their older counterparts if they experienced weakness as part of their symptom constellation. Men experiencing weakness in the MI subgroup also presented more quickly than their female counterparts with the same symptom (t = 4.190, p = .014).

Symptoms classified as "other" were also associated with a decreased presentation time in patients 65 years and younger compared to those older than 65 years, in both the total sample (t = 2.009, p = .048) and the men only group (t = 3.140, p = .004). Vomiting in those over 65 years of age prompted patients in the MI subgroup to present to hospital more quickly than their younger counterparts (t = 5.036, p = .015). Of the patients in the women only group who experienced dizziness, those with a final diagnosis other than MI, presented to the ED more quickly than patients diagnosed with MI (t = 3.317, p = .003).

Patients whose descriptions of their pain fell in the "other" category were the swiftest to present to hospital, followed by those who described their pain as "tightness", "heaviness", "indigestion", "sharp", "pressure", "burning", "crushing", squeezing", "dull", and "aching". "Aching" ($t = 2.536$, $p = .029$) and "tightness" ($t = 2.316$, $p = .035$) were associated with a decreased presentation time for women compared to men in the total sample. In the "men only" group patients who described their pain as "aching" and did not have a final diagnosis of MI presented to the ED more quickly than those who were diagnosed with a MI ($t = 2.321$, $p = .045$). "Sharp" chest pain was associated with decreased presentation time in those with a final diagnosis other than MI, in the total sample ($t = 2.113$, $p = .045$) and the "men only" subgroup ($t = 2.775$, $p = .014$). In the MI subgroup, women who described their chest pain as "sharp" presented to ED more quickly than men with "sharp" chest pain ($t = 6.128$, $p = .008$). In age related comparisons, only "burning" chest pain was associated with decreased presentation time in the total sample for patients 65 years of age and younger ($t = 2.517$, $p = .044$). No other descriptors revealed statistically significant differences on the basis of age, gender or final diagnosis.

· *Radiation of Pain.* Of all the sites to which pain was reported to radiate, only the jaw and left arm were associated with decreased presentation time. Women in both the total sample ($t = 2.538$, $p = .019$) and non-MI subgroup ($t = 2.593$, $p = .023$) who described pain radiating to the jaw, presented to the ED more rapidly than their male counterparts with the same symptoms. Pain radiating to the left arm was associated with decreased presentation time for women when compared with men, in the total sample ($t = 2.320$, $p = .022$) and the non-MI subgroup ($t = 2.614$, $p = .011$), as well as for patients 65 years

of age or less, when compared with their older counterparts in the non-MI subgroup. There were no other statistically significant differences on the basis of age, gender, or final diagnosis.

Table 43
Presentation time vs. Demographics and Clinical Presentation

	Variable present			Variable absent			
Variable	N	Mean	SD	N	Mean	SD	p
Gender							
Male	198	252.72	283.78	149	221.30	251.50	.285
Age							
> 65 yrs.	174	235.02	241.67	173	243.46	297.28	.772
Marital Status							
Married	227	230.39	276.93	120	255.95	258.10	.403
Single	34	251.50	267.25	303	235.58	272.67	.747
Widowed	54	246.33	241.73	283	235.45	277.50	.788
Divorced	15	257.20	301.39	332	238.42	269.46	.793
Day of week							
Weekend	111	283.00	271.80	236	218.64	267.94	**.038**
Onset time							
0001-0600	71	262.85	262.72	276	233.15	272.56	.410
0601-1200	122	245.24	290.24	225	235.97	259.72	.761
1201-1800	77	221.81	252.39	270	244.20	275.65	.522
1801-2400	77	225.35	265.62	270	243.19	272.19	.610
Risk Factors							
Smoker	67	256.84	240.00	199	222.06	265.81	.344
Diabetes	66	300.36	337.84	248	225.50	251.89	**.048**
Dyslipidemia	136	271.51	323.28	85	214.40	237.58	.161
Family History	112	260.00	298.69	127	225.94	253.35	.341
Hypertension	149	254.46	251.38	119	240.98	317.36	.698
Medical History							
Angina	82	250.57	231.67	241	227.12	274.21	.488
MI	98	255.09	242.76	231	229.72	276.95	.432
PTCA	42	289.71	246.67	287	299.61	269.52	.174
CABG	51	200.65	203.58	279	243.52	276.59	.292
CVA	30	232.20	161.48	300	237.36	275.30	.920
CHF	19	307.26	287.70	310	232.99	265.69	.240
Renal Insufficiency	24	239.50	212.42	299	239.22	273.21	.996
Renal failure	7	128.43	93.60	323	239.24	268.89	.278
TIA	8	229.63	228.89	322	237.07	267.98	.938
Arrhythmia	41	237.07	320.56	41	237.07	320.56	.984
CABG list	3	106.33	45.55	344	240.39	271.34	.393

Table 43 (Continued)
Presentation time vs. Demographics and Clinical Presentation

	Variable present			Variable absent			
Variable	N	Mean	SD	N	Mean	SD	p
Chief Complaint							
Chest pain:							
Nonspecific	97	220.03	247.13	250	246.68	279.11	.411
Retrosternal	69	310.32	375.61	278	221.58	234.88	.065
Left sided	70	247.97	239.27	277	237.02	278.15	.763
Right sided	9	187.56	248.37	338	240.60	271.23	.562
Midsternal	46	167.00	151.68	301	250.27	282.83	**.003**
Epigastric pain	17	232.35	297.13	330	239.58	269.51	.915
Dyspnea	13	227.31	285.97	334	239.69	270.29	.872
General malaise	2	192.00	101.82	345	239.50	271.17	.805
Abdominal pain	2	260.50	166.17	345	239.10	271.10	.911
Right arm pain	2	395.50	420.73	345	238.32	270.04	.413
Back	4	258.25	281.28	343	239.01	270.76	.888
Left arm/shoulder	4	259.00	212.62	343	239.00	271.30	.883
Palpitations	3	314.67	412.41	344	238.57	269.72	.628
Tightness	1	159.00		346	239.46	270.82	.767
Other	8	219.50	211.21	339	239.69	271.94	.835
Associated Symptoms							
Diaphoresis	117	243.51	268.14	189	234.40	285.17	.781
Dyspnea	149	236.86	282.26	169	235.74	270.63	.971
Dizziness	36	187.44	216.20	251	244.97	285.25	.246
Nausea	83	204.60	209.10	226	244.43	290.85	.254
Vomiting	13	184.85	201.22	294	235.32	274.45	.513
Palpitations	27	279.93	345.12	253	236.78	272.65	.448
Weakness	18	189.89	181.16	258	243.60	285.24	.432
Fatigue	6	259.83	286.01	270	238.74	279.69	.855
Syncope	6	209.50	88.21	270	239.94	282.12	.792
Other	94	212.27	212.23	236	246.99	295.29	.300
Descriptor							
Aching	16	498.00	593.38	216	233.07	252.71	.096
Burning	12	265.75	250.78	217	247.47	293.42	.833
Crushing	28	267.11	265.79	201	245.83	294.74	.718
Dull	14	335.64	276.52	215	242.75	291.51	.248
Heavy	47	194.11	186.03	182	262.46	311.17	**.046**
Pressure	6	219.33	158.50	223	249.21	293.79	.938
Sharp	28	221.43	226.42	201	252.19	299.04	.601
Squeezing	19	267.47	249.88	210	246.70	294.78	.804
Tightness	27	177.15	230.19	202	257.96	297.25	.176
Other	10	162.40	144.27	219	252.36	295.44	.340
Radiation							
Back	33	166.06	175.44	232	236.54	262.58	.136
Jaw	24	181.04	119.83	247	236.31	272.08	.071
Left arm	103	237.54	216.06	168	227.65	287.88	.764
Left Shoulder	26	279.50	222.13	245	226.31	266.34	.327
Neck	36	280.17	308.36	235	223.94	254.71	.232
Right arm	34	230.74	241.33	237	234.99	272.42	.931
Shoulders(bilateral)	7	309.14	238.79	264	229.35	263.23	.428
Throat	9	227.00	147.34	262	231.56	265.76	.959

Table 44
Presentation Time by Gender

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Age							
> 65 yrs.	98	234.57	219.58	76	235.61	269.00	.978
≤ 65 yrs.	100	270.50	335.21	73	206.41	232.83	.162
Marital Status							
Married	149	246.79	293.37	78	199.06	241.16	.218
Single	20	276.00	259.46	14	216.50	284.03	.531
Widowed	15	280.67	306.34	39	233.13	215.12	.523
Divorced	4	145.75	99.46	11	297.73	342.67	.408
Day of week							
Weekend	71	331.85	296.47	40	196.30	196.33	**.005**
Weekday	127	208.48	267.55	109	230.48	269.16	.531
Onset time							
0001-0600	38	273.74	279.46	33	250.30	245.73	.711
0601-1200	72	303.60	348.72	50	161.20	140.02	**.002**
1201-1800	43	190.09	141.69	34	261.91	343.78	.259
1801-2400	45	213.40	263.57	32	242.16	271.80	.643
Risk Factors							
Smoker	48	263.15	232.35	19	240.89	264.32	.735
Diabetes	46	291.43	370.52	20	320.90	254.33	.747
Dyslipidemia	83	274.28	336.08	53	267.17	305.26	.901
Family History	65	282.65	340.60	47	228.68	228.39	.348
Hypertension	87	249.02	220.49	62	262.10	290.99	.756
Medical History							
Angina	49	264.14	250.75	33	230.42	202.08	.521
MI	70	239.07	220.89	28	295.14	291.03	.304
PTCA	33	285.79	241.91	9	304.11	278.34	.846
CABG	36	210.75	224.66	15	176.40	224.66	.588
CHF	12	337.50	341.42	7	255.43	172.20	.564
Renal Insufficiency	16	260.25	229.29	8	198.00	180.69	.511
Renal failure	5	136.20	113.21	2	109.00	15.56	.762
CVA	21	197.29	136.47	9	313.67	193.13	.070
TIA	7	238.00	245.90	1	171.00		.807
Arrhythmia	21	202.05	233.66	20	273.85	395.07	.480
CABG list	3	106.07					

Table 44 (Continued)
Presentation Time by Gender

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Chief Complaint							
Chest pain							
Nonspecific	44	249.09	315.99	53	195.91	169.93	.320
Retrosternal	42	298.31	361.71	27	329.00	402.59	.743
Left sided	47	266.62	252.87	23	209.87	208.79	.355
Right sided	6	111.17	96.38	3	340.33	413.53	.439
Midsternal	26	177.19	156.16	20	153.75	148.58	.609
Epigastric pain	11	291.27	345.37	6	124.33	149.37	.282
Dyspnea	8	185.63	151.36	5	294.00	442.95	.530
General malaise				2	192.00	101.82	
Abdominal pain				2	260.50	166.17	
Right arm pain	1	693.00		1	98.00		
Back	4	258.25	281.28				
Left arm/shoulder	4	259.00	212.62				
Palpitations	1	102.00		2	421.00	521.85	.705
Other	3	344.00	327.95	5	144.80	75.41	.403
Associated Symptoms							
Diaphoresis	71	230.25	223.12	46	263.98	327.42	.509
Dyspnea	79	254.35	317.42	70	217.11	237.16	.423
Dizziness	14	240.36	287.74	22	153.77	153.61	.247
Nausea	45	188.31	195.45	38	223.89	225.31	.443
Vomiting	8	233.13	247.21	5	107.60	49.06	.293
Palpitations	12	253.08	230.68	15	301.40	422.23	.725
Weakness	10	137.30	131.94	8	255.63	220.07	.176
Fatigue	2	433.50	533.87	4	173.00	105.69	.615
Syncope	3	164.33	69.29	3	254.67	92.35	.247
Other	42	222.55	202.68	52	203.96	221.26	.675
Descriptor							
Aching	11	657.18	661.70	5	147.80	52.47	**.029**
Burning	5	284.20	313.22	7	252.57	222.27	.841
Crushing	16	184.44	138.90	12	377.33	351.94	.095
Dull	10	362.70	301.58	4	268.00	223.48	.583
Heavy	22	204.36	200.30	25	185.08	176.20	.727
Indigestion	3	290.33	180.69	3	148.33	122.58	.118
Pressure	10	96.80	57.36	12	371.58	494.26	.082
Sharp	18	217.06	242.01	10	229.30	207.51	.894
Squeezing	9	299.00	276.88	10	239.10	234.20	.616
Tightness	15	254.87	284.70	12	80.00	59.61	**.035**
Other	7	128.71	92.64	3	241.00	233.82	.496
Radiation							
Back	14	177.93	175.10	19	157.32	179.97	.744
Jaw	13	231.00	126.49	11	122.00	82.13	**.019**
Left arm	62	274.18	238.85	41	182.15	163.74	**.022**
Left shoulder	14	240.93	150.11	12	324.50	285.32	.349
Neck	12	345.33	423.78	24	247.58	235.55	.378
Right arm	18	218.72	253.27	16	244.25	234.65	.763
Shoulders (bilateral)	2	333.00	315.37	5	299.60	245.50	.884
Throat	4	299.25	176.41	5	169.20	103.37	.207

Table 45
Presentation Time by Age

Variable	>65 yrs. N	Mean	SD	≤65 yrs. N	Mean	SD	p
Gender							
Male	98	234.57	219.58	100	270.50	335.21	.373
Female	76	235.61	269.00	73	206.41	232.83	.481
Marital Status							
Married	110	216.79	224.35	117	243.17	319.03	.470
Single	5	419.20	326.54	29	222.59	251.11	.131
Widowed	51	256.55	244.94	3	72.67	24.58	**<.001**
Divorced	6	291.83	419.08	9	234.11	218.39	.731
Day of week							
Weekend	59	264.46	212.49	52	304.04	327.32	.459
Weekday	115	219.92	254.91	121	217.42	280.83	.943
Onset time							
0001-0600	40	248.80	233.94	31	280.97	298.83	.612
0601-1200	59	220.03	205.45	63	268.84	351.78	.355
1201-1800	42	254.02	308.83	35	183.14	156.72	.222
1801-2400	33	220.94	221.37	44	228.66	296.99	.901
Risk Factors							
Smoker	18	339.44	221.01	49	226.49	241.67	.088
Diabetes	44	276.82	247.98	22	347.45	473.16	.428
Dyslipidemia	79	266.42	279.09	57	278.56	378.64	.830
Family History	51	234.90	235.29	61	280.98	343.42	.419
Hypertension	101	257.94	262.80	48	247.15	227.96	.807
Medical History							
Angina	57	274.40	244.68	25	196.24	192.35	.161
MI	71	253.80	253.95	27	258.48	214.98	.933
PTCA	31	292.81	254.86	11	281.00	223.45	.893
CABG	38	189.13	208.78	13	234.31	191.41	.495
CHF	18	321.28	289.30	1	55.00		.383
Renal Insufficiency	16	260.25	229.29	8	198.00	180.69	.511
Renal failure	6	133.50	101.48	1	98.00		.759
CVA	23	260.17	169.26	7	140.29	90.22	**.024**
TIA	7	251.71	237.84	1	75.00		.513
Arrhythmia	30	290.40	359.40	11	91.64	68.06	**.007**
CABG list	1	104.00		2	107.50	64.35	.972

Table 45 (Continued)
Presentation Time by Age

Variable	> 65 yr.s N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Chief Complaint							
Chest pain							
Nonspecific	59	202.05	207.70	38	247.95	299.21	.375
Retrosternal	37	315.16	344.66	32	304.72	414.08	.909
Left sided	28	238.61	216.33	42	254.21	255.79	.791
Right sided	4	321.00	334.30	5	80.80	86.48	.161
Midsternal	20	244.55	186.56	26	122.73	101.35	**.036**
Epigastric pain	4	242.25	360.47	13	229.31	291.87	.942
Dyspnea	9	188.78	138.77	4	314.00	511.15	.661
General malaise	2	192.00	101.82				
Abdominal pain	2	260.50	166.17				
Right arm pain				2	395.50	420.73	
Back				4	258.25	281.28	
Left arm/shoulder	2	195.00	103.24	2	323.00	329.51	
Palpitations	1	102.00		2	421.00	521.85	.705
Other	3	344.00	327.96	5	144.80	75.41	.403
Associated Symptoms							
Diaphoresis	63	273.87	299.05	54	208.09	224.46	.187
Dyspnea	74	231.24	226.57	75	242.40	329.61	.810
Dizziness	17	210.41	255.40	19	166.89	178.78	.554
Nausea	46	197.54	180.92	37	213.38	241.93	.734
Vomiting	10	149.00	83.76	3	304.33	428.40	.595
Palpitations	18	327.33	393.51	9	185.11	207.07	.322
Weakness	9	281.44	219.94	9	98.33	50.04	**.038**
Fatigue	6	259.83	286.01				
Syncope	4	180.00	76.71	2	268.50	103.95	.292
Other	47	255.53	233.80	47	169.00	180.50	**.048**
Descriptor							
Aching	6	303.67	199.07	10	614.60	724.24	.227
Burning	7	378.29	281.30	5	108.20	32.44	**.044**
Crushing	18	308.28	293.84	10	193.01	198.35	.280
Dull	5	245.20	140.31	9	385.89	326.28	.383
Heavy	25	223.40	196.58	22	160.82	171.65	.254
Indigestion	1	286.00		5	206.00	173.40	.695
Pressure	12	288.08	458.01	10	197.00	293.62	.594
Sharp	8	272.13	309.73	20	201.15	189.72	.464
Squeezing	11	261.00	244.34	8	276.38	274.07	.899
Tightness	12	109.08	84.71	15	231.60	292.61	.141
Other	1	60.00		9	173.78	148.18	.496
Radiation							
Back	14	236.71	235.94	19	114.00	88.18	.083
Jaw	18	193.67	119.81	6	143.17	122.27	.383
Left arm	59	265.93	209.31	44	499.48	221.47	.123
Left shoulder	8	250.25	176.13	18	292.50	243.32	.664
Neck	14	245.14	218.40	22	302.45	357.23	.594
Right arm	22	228.18	198.93	12	235.42	314.84	.935
Shoulders (bilateral)	1	59.00		6	350.83	232.00	.297
Throat	5	198.40	76.82	4	262.75	216.70	.551

Table 46
Presentation time by Final Diagnosis

Variable	MI N	MI Mean	MI SD	Non MI N	Non MI Mean	Non MI SD	p
Gender							
Male	40	290.02	389.78	154	245.44	251.65	.379
Female	18	251.56	168.96	128	216.96	263.17	.589
Age							
> 65 yrs.	38	232.29	190.54	132	237.89	256.88	.901
≤ 65 yrs.	20	365.10	505.47	150	227.78	257.64	.246
Marital Status							
Married	34	299.74	400.11	188	220.01	249.90	.125
Single	7	301.71	258.32	27	238.48	272.76	.585
Widowed	15	249.07	207.75	37	243.16	260.83	.938
Divorced				15	257.20	301.39	
Day of week							
Weekend	16	358.88	334.14	93	271.04	260.96	.236
Weekday	42	247.31	335.32	189	213.55	253.38	.464
Onset time							
0001-0600	15	294.73	217.61	53	256.85	279.72	.630
0601-1200	25	295.08	433.32	97	232.39	241.71	.338
1201-1800	9	188.89	142.24	68	226.16	263.97	.680
1801-2400	9	292.33	355.79	64	219.28	256.67	.449
Risk Factors							
Smoker	11	253.18	247.60	55	260.31	242.10	.930
Diabetes	12	367.50	581.64	54	285.44	261.76	.451
Dyslipidemia	29	286.34	434.67	105	267.96	289.93	.789
Family History	22	298.95	453.10	90	250.48	249.73	.497
Hypertension	36	221.72	175.08	111	265.30	272.37	.369
Medical History							
Angina	9	316.89	294.88	73	242.40	223.83	.366
MI	18	203.39	176.40	98	255.09	242.76	.301
PTCA	3	154.67	141.33	39	300.10	251.10	.331
CABG	3	307.33	253.64	47	196.85	202.63	.370
CVA	10	229.30	165.62	20	233.65	163.71	.946
CHF	1	74.00		18	320.22	290.28	.420
Renal Insufficiency	10	287.70	277.14	14	205.07	153.61	.359
Renal failure	5	151.60	103.38	2	70.50	20.51	.345
TIA	2	497.50	402.34	6	140.33	51.94	.427
Arrhythmia	9	164.89	101.74	31	251.94	362.31	.484
CABG list	1	104.00		2	107.50	63.35	.972

Table 46 (Continued)
Presentation Time by Final Diagnosis

Variable	MI N	MI Mean	MI SD	Non MI N	Non MI Mean	Non MI SD	p
Chief Complaint							
Chest pain							
Nonspecific	19	248.53	157.64	74	215.14	268.16	.605
Retrosternal	16	389.31	531.95	52	283.79	319.29	.333
Left sided	5	176.40	139.50	64	256.73	245.61	.475
Right sided	1	49.00		8	204.88	259.64	.589
Midsternal	4	162.00	157.71	42	167.48	153.06	.946
Epigastric pain	5	440.60	480.52	12	145.58	128.56	.244
Dyspnea	2	112.00	25.46	11	248.27	308.10	.559
General malaise	2	192.00	101.82				
Abdominal pain	1	378.00					
Right arm pain	1	98.00		1	693.00		
Back				4	258.25	281.28	
Left arm/shoulder				4	259.00	212.62	
Palpitations				3	314.67	412.41	
Other	2	156.00	55.15	6	240.67	244.32	.660
Associated Symptoms							
Diaphoresis	27	202.96	176.52	89	256.94	291.15	.243
Dyspnea	25	304.52	433.64	121	224.04	242.41	.198
Dizziness	3	328.00	222.70	33	174.67	214.48	.245
Nausea	20	259.60	191.17	63	187.14	212.93	.160
Vomiting	5	300.80	294.51	7	108.00	69.06	.120
Palpitations	1	317.00		26	278.50	351.87	.915
Weakness	6	184.83	124.17	12	192.42	209.02	.936
Fatigue	2	548.50	371.23	4	115.50	84.07	.342
Syncope	3	244.00	35.79	3	195.00	132.44	.733
Other	14	248.36	222.85	80	205.95	211.14	.493
Descriptor							
Aching	4	990.25	883.91	11	354.64	398.56	.069
Burning	3	500.00	269.50	9	187.67	202.18	.057
Crushing	3	160.00	71.72	24	289.17	280.35	.441
Dull	1	415.00		13	329.54	286.82	.779
Heavy	10	174.90	122.11	37	199.30	200.90	.717
Indigestion	1	286.00		5	206.00	173.40	.695
Pressure	2	106.50	3.54	18	258.06	423.16	.627
Sharp	3	474.33	266.47	24	197.17	209.04	.045
Squeezing	4	398.50	338.47	15	232.53	222.53	.249
Tightness	7	151.29	126.46	19	194.00	263.77	.687
Other	2	122.50	38.89	8	172.38	161.16	.688
Radiation							
Back	5	164.20	131.93	28	166.39	184.12	.980
Jaw	4	243.75	82.63	20	168.50	123.73	.261
Left arm	19	291.11	290.16	83	227.60	195.88	.250
Left shoulder	4	276.00	148.51	22	280.14	235.77	.973
Neck	5	202.40	155.25	31	292.71	326.42	.551
Right arm	7	237.29	390.50	27	229.04	196.76	.937
Shoulders (bilateral)				7	309.14	238.79	
Throat	1	109.00		8	241.75	150.25	.432

Table 47
Presentation Time by Gender (MI Subgroup)

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Age							
> 65 years	25	230.64	208.26	13	235.46	158.69	.942
≤ 65 years	15	389.00	576.27	5	293.40	206.76	.725
Marital Status							
Married	27	301.78	443.56	7	291.86	166.87	.954
Single	5	332.80	278.61	2	224.00	270.12	.658
Widowed	6	283.17	270.54	9	226.33	168.32	.622
Day of week							
Weekday	29	232.00	388.88	13	281.46	171.67	.664
Weekend	10	312.40	280.48	6	436.33	426.40	.492
Time of Onset							
0001-0600	9	294.00	250.02	6	295.83	180.50	.988
0601-1200	18	333.61	504.49	7	196.00	118.61	.488
1201-1800	8	138.25	136.90	1	354.00		.242
1801-2400	5	320.80	449.88	4	256.75	254.31	.808
Risk Factors							
Smoker	10	249.90	260.76	1	286.00		.898
Diabetic	9	379.67	672.75	3	331.00	218.34	.907
Dyslipidemia	22	308.82	495.40	7	231.43	134.62	.708
Family History	15	324.20	544.79	7	244.86	145.02	.712
Hypertension	22	214.27	184.75	14	233.43	165.66	.754
Medical History							
Angina	8	309.88	314.44	1	373.00		.855
MI	14	199.14	188.40	4	218.25	148.82	.865
PTCA	2	73.50	20.51	1	317.00		.065
CABG	1	49.00		2	436.50	169.00	.312
CVA	6	111.33	33.23	4	406.25	104.24	**<.001**
Renal Insufficiency	9	306.67	286.98	1	117.00		.548
Renal failure	3	180.00	135.02	2	109.00	15.56	.533
Arrhythmia	6	165.17	96.10	3	164.33	135.36	.992
Chief Complaint							
Chest pain							
Nonspecific	14	195.57	140.82	5	396.80	100.44	**.010**
Retrosternal	13	402.38	587.07	3	332.67	220.13	.846
Left sided	2	211.50	174.66	3	153.00	147.02	.710
Right sided	1	49.00					
Midsternal	3	191.33	179.29	1	74.00		.628
Epigastric pain	4	536.00	497.18	1	59.00		.454
Dyspnea	1	130.00		1	94.00		

Table 47 (Continued)
Presentation Time by Gender (MI Subgroup)

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Associated Symptoms							
Diaphoresis	22	185.27	169.63	5	280.80	205.37	.283
Dyspnea	16	330.63	529.60	9	258.11	185.63	.697
Dizziness	1	111.00		2	436.50	169.00	.361
Nausea	12	236.17	194.51	8	294.75	193.36	.517
Vomiting	3	445.33	307.43	2	84.00	35.36	.214
Weakness	4	112.50	59.22	2	329.50	61.52	**.014**
Fatigue	1	811.00		1	286.00		
Syncope	2	204.00	12.73	1	264.00		.162
Other	7	273.29	271.36	7	223.43	180.33	.693
Descriptor							
Aching	3	1287.67	800.76	1	98.00		.327
Burning	2	573.00	336.59	1	354.00		.689
Crushing	3	160.00	71.72				
Heavy	8	157.38	112.85	2	245.00	181.02	.395
Pressure	2	106.50	3.54				
Sharp	1	782.00		2	320.50	4.95	**.008**
Squeezing	3	345.67	393.82	1	557.00		.688
Tightness	4	214.50	136.23	3	67.00	38.63	.116
Other	2	122.50	38.89				
Radiation							
Back	2	51.00	24.04	3	239.67	114.75	.117
Jaw	3	229.67	95.13	1	286.00		.659
Left arm	13	299.92	331.09	6	272.00	198.40	.852
Left shoulder	2	201.50	188.80	2	350.50	188.80	.421
Neck	2	184.50	212.84	3	214.33	158.18	.866
Right arm	6	271.33	416.23	1	33.00		.619

Table 48
Presentation Time by Age (MI Subgroup)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Marital Status							
Married	21	202.24	130.62	13	457.23	606.88	.160
Single	2	422.00	550.13	5	253.60	119.60	.740
Widowed	15	249.07	207.75				
Day of Week							
Weekday	28	203.68	142.49	14	334.57	547.86	.394
Weekend	11	443.00	365.49	5	173.80	149.85	.056
Onset time							
0001-0600	8	227.88	168.66	7	371.14	254.05	.215
0601-1200	17	244.41	223.37	8	402.75	714.34	.406
1201-1800	7	230.00	134.40	2	45.00	15.56	**.010**
1801-2400	6	206.50	214.86	3	464.00	569.77	.520
Risk Factors							
Smoker	3	320.33	250.27	8	228.00	258.88	.608
Diabetes	8	189.00	95.78	4	724.50	981.92	.355
Dyslipidemia	17	218.00	204.01	12	383.17	634.79	.400
Family History	11	171.09	130.99	11	426.82	614.83	.192
Hypertension	26	241.85	185.79	10	169.40	138.24	.272
Medical History							
Angina	6	406.50	328.47	3	137.67	76.25	.218
MI	16	204.13	182.28	2	197.50	174.66	.962
PTCA	3	154.67	141.33				
CABG	2	183.00	189.51	1	556.00		.354
CVA	9	241.89	170.51	1	116.00		.504
Renal Insufficiency	10	287.70	277.14				
Renal failure	4	165.00	114.25	1	98.00		.636
Arrhythmia	9	164.89	101.74				
Chief Complaint							
Chest pain							
Nonspecific	15	238.93	138.29	4	284.50	240.18	.737
Retrosternal	8	274.63	265.06	8	504.00	711.38	.407
Left sided	4	136.75	124.37	1	335.00		.249
Right sided	1	49.00					
Midsternal	2	253.00	203.65	2	71.00	4.24	.334
Epigastric pain	2	420.50	511.24	3	454.00	574.83	.951
Dyspnea	2	112.00	25.46				
General Malaise	2	192.00	101.82				
Other	1	117.00		1	195.00		

Table 48 (Continued)
Presentation Time by Age (MI Subgroup)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Associated Symptoms							
Diaphoresis	19	235.95	193.42	8	124.63	97.83	.137
Dyspnea	17	205.29	173.26	8	515.38	708.09	.259
Dizziness	1	317.00		2	333.50	314.66	.973
Nausea	16	206.69	131.89	4	471.25	264.25	.137
Vomiting	4	176.25	110.60	1	799.00		**.015**
Weakness	2	329.50	61.52	4	112.50	59.22	**.014**
Fatigue	2	548.50	371.23				
Syncope	2	238.50	36.06	1	195.00		.505
Other	9	264.33	236.77	5	219.60	218.35	.734
Descriptor							
Aching	1	586.00		3	1125.00	1031.02	.695
Burning	3	500.00	256.50				
Crushing	3	160.00	71.72				
Heavy	7	213.43	127.87	3	85.00	26.89	.134
Pressure	2	106.50	3.54				
Sharp	2	549.50	328.81	1	324.00		.675
Squeezing	3	265.00	254.77	1	799.00		.211
Tightness	4	86.75	50.55	3	237.33	157.20	
Other				2	122.50	38.89	
Radiation							
Back	2	197.50	125.16	3	142.00	158.53	.709
Jaw	3	213.33	68.48	1	335.00		.264
Left arm	11	226.09	198.16	8	380.50	380.30	.264
Left shoulder	2	310.50	34.65	2	241.50	245.37	.732
Neck	3	218.00	162.08	2	179.00	205.06	.825
Right arm	4	94.50	62.14	3	427.67	597.10	.436

Table 49
Presentation Time by Gender (Non-MI Subgroup)

	Men			Women			
Variable	N	Mean	SD	N	Mean	SD	p
Marital status							
Married	118	237.14	250.58	70	191.11	247.82	.223
Single	15	257.07	260.09	12	215.25	297.81	.700
Widowed	9	279.00	344.21	28	231.64	234.61	.642
Divorced	4	145.75	99.46	11	297.73	342.67	.408
Day of week							
Weekday	59	316.10	281.01	34	192.85	202.84	.514
Weekend	85	228.07	284.82	104	201.68	225.19	.017
Onset time							
0001-0600	28	274.89	294.37	25	236.64	266.92	.624
0601-1200	54	293.59	284.37	76	155.53	143.63	.003
1201-1800	35	195.09	144.24	33	259.12	348.72	.333
1801-2400	37	200.49	238.22	27	245.04	282.60	.497
Risk Factors							
Smoking	38	266.63	228.00	17	246.18	278.04	.775
Diabetes	37	269.97	261.94	17	319.12	266.14	.527
High cholesterol	60	267.03	261.66	45	269.20	326.91	.970
Family history	50	270.18	256.97	40	225.85	241.31	.406
Hypertension	64	263.94	232.00	47	267.15	321.98	.951
Medical history							
Angina	41	255.22	240.10	32	225.97	203.66	.583
MI	55	252.51	229.36	24	307.96	308.77	.435
PTCA	31	299.48	243.33	8	302.50	297.51	.976
CABG	34	219.97	227.93	13	136.38	95.10	.209
CHF	11	361.45	347.35	7	255.43	172.20	.467
CVA	15	231.67	147.58	5	239.60	225.88	.928
Renal Insufficiency	7	200.57	119.30	7	209.57	191.94	.918
Renal failure	2	70.50	20.506				
TIA	5	134.20	55.59	1	171.00		
Arrhythmia	20	340.10	426.34	11	91.64	68.06	.610
Chief Complaint							
Chest pain							
Non specific	27	282.48	383.45	47	176.45	163.76	.181
Retrosternal	29	251.66	191.27	23	324.30	432.07	.459
Left sided	44	274.16	257.59	20	218.40	218.21	.404
Right sided	5	123.60	102.24	3	340.33	413.53	.461
Midsternal	23	175.35	157.35	19	157.95	151.43	.719
Epigastric pain	7	151.43	111.66	5	137.40	163.12	.862
Dyspnea	7	193.57	161.67	4	344.00	494.91	.592
Palpitations	1	102.00		2	421.00	521.85	.705
Other	1	720.00		5	144.80	75.41	.002

Table 49 (Continued)
Presentation time by Gender (Non-MI Subgroup)

	Men			Women			
Variable	N	Mean	SD	N	Mean	SD	p
Associated Symptoms							
Diaphoresis	49	250.45	242.21	40	264.90	344.90	.817
Dyspnea	62	238.16	239.39	59	209.20	246.72	.514
Dizziness	13	250.31	296.97	20	125.50	123.78	.172
Nausea	33	170.91	195.83	30	205.00	232.35	.530
Vomiting	5	105.80	75.15	2	113.50	77.08	.908
Palpitations	12	253.08	230.69	14	300.29	438.14	.741
Weakness	6	153.83	168.56	6	231.00	253.24	.548
Fatigue	1	56.00		3	135.33	90.78	.528
Syncope	1	85.00		2	250.00	130.11	.489
Other	35	212.40	189.49	45	200.93	228.56	.811
Descriptors							
Aching	8	420.75	456.11	3	178.33	44.66	.397
Burning	3	91.67	23.63	6	235.67	238.50	.347
Crushing	12	201.00	153.34	12	377.33	351.94	.132
Dull	10	362.70	301.58	3	219.00	245.98	.471
Heavy	14	231.21	236.25	23	179.87	178.96	.459
Pressure	8	94.38	64.77	10	389.00	540.47	.121
Sharp	16	192.50	206.11	8	206.50	228.89	.881
Squeezing	6	275.67	242.20	9	203.78	218.34	.560
Tight	10	292.70	335.20	9	84.33	66.54	.084
Other	5	131.20	111.66	3	241.00	233.82	.392
Radiation							
Back	12	199.08	181.01	16	141.88	188.42	.426
Jaw	10	231.40	139.00	10	105.60	64.87	**.023**
Left arm	48	271.98	211.54	35	166.74	155.20	**.011**
Left shoulder	12	247.50	151.85	10	319.30	313.68	.520
Neck	10	377.50	455.59	21	252.33	247.21	.432
Right arm	12	192.42	134.61	15	258.33	235.78	.398
Throat	3	362.67	150.16	5	169.20	103.67	.071

Table 50
Presentation Time by Age (Non-MI Subgroup)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Marital status							
Married	87	224.17	243.02	101	216.42	256.82	.833
Single	3	417.33	248.83	24	216.13	272.07	.235
Widowed	34	258.21	267.03	3	72.67	24.58	.243
Divorced	6	291.83	419.08	9	234.11	218.39	.731
Day of week							
Weekend	85	228.07	284.82	104	201.68	225.19	.570
Weekday	47	255.64	198.18	46	286.78	313.97	.478
Onset time							
0001-0600	29	258.66	257.06	24	254.67	310.56	.959
0601-1200	42	210.17	199.74	55	249.36	269.99	.432
1201-1800	35	258.33	334.19	33	191.52	157.55	.297
1801-2400	26	231.31	228.02	38	211.05	277.26	.759
Risk Factors							
Smoking	15	243.27	224.21	40	229.20	243.87	.121
Diabetes	36	296.33	267.51	18	263.67	255.98	.670
Dyslipidemia	60	280.93	299.39	45	250.67	279.20	.599
Family History	40	252.45	255.18	50	248.90	247.87	.947
Hypertension	73	264.10	287.86	38	267.61	243.51	.949
Medical History							
Angina	51	258.86	232.23	22	204.23	202.91	.342
MI	54	272.13	271.98	25	263.36	220.14	.888
PTCA	28	307.61	261.43	11	281.00	233.45	.770
CABG	35	193.20	214.15	12	207.50	172.56	.836
CHF	17	335.82	291.34	1	55.00		.363
CVA	14	271.93	173.81	6	144.33	98.13	.112
Renal Insufficiency	12	211.00	162.42	2	169.50	116.67	.739
Renal failure	2	70.50	20.51				
TIA	5	153.40	45.73	1	75.00		.193
Arrhythmia	20	340.10	426.34	11	91.64	68.07	**.019**
Chief Complaint							
Chest pain							
Non specific	42	196.19	229.80	32	240.00	313.63	.490
Retrosternal	28	322.79	373.06	24	238.29	242.21	.346
Left sided	24	255.58	225.42	40	257.43	259.77	.976
Right sided	3	411.67	344.04	5	80.80	86.48	.235
Midsternal	18	221.39	190.67	24	127.04	104.45	.070
Epigastric pain	2	64.00	36.77	10	161.90	135.19	.350
Dyspnea	7	193.57	161.67	4	344.00	494.91	.717
Left arm/shoulder pain	2	195.00	103.24	2	323.00	329.51	.652
Palpitations	1	52.00		2	446.00	486.49	.628
Other	5	144.80	75.41	1	720.00		**.002**

Table 50 (Continued)
Presentation Time by Age (Non-MI Subgroup)

Variable	> 65 yrs N	Mean	SD	≤ 65 yrs N	Mean	SD	p
Associated symptoms							
Diaphoresis	43	293.67	338.41	46	222.61	237.47	.252
Dyspnea	55	239.24	242.55	66	221.38	243.42	.531
Dizziness	16	203.75	262.24	17	147.29	160.91	.459
Nausea	30	192.67	204.27	33	182.12	223.56	.846
Vomiting	5	128.40	73.00	2	57.00	4.24	.248
Palpitations	17	327.94	405.61	9	185.11	207.07	.335
Weakness	7	267.71	250.76	5	87.00	44.89	.107
Syncope	2	121.50	51.62	1	342.00		.178
Other	38	253.45	236.25	42	162.98	177.62	.059
Descriptor							
Aching	5	247.20	160.07	6	444.17	525.39	.444
Burning	4	287.00	289.68	5	108.20	32.44	.305
Crushing	14	357.86	315.63	10	193.00	198.35	.160
Dull	5	245.20	140.31	8	382.25	348.61	.426
Heavy	18	227.28	220.74	19	172.79	182.16	.417
Pressure	8	334.38	558.61	10	197.00	293.62	.510
Sharp	16	192.50	206.11	8	206.50	228.89	.819
Squeezing	8	259.50	258.33	7	201.71	188.69	.634
Tight	7	132.00	100.48	12	230.17	323.22	.450
Other	1	60.00		7	188.43	167.03	.499
Radiation							
Back	12	243.25	253.06	16	108.75	76.11	.099
Jaw	15	189.73	129.07	5	104.80	87.46	.191
Left arm	48	275.06	211.54	35	166.74	155.20	**.006**
Left shoulder	6	230.17	203.11	16	298.88	250.39	.522
Neck	11	252.55	234.65	20	314.80	370.22	.620
Right arm	18	257.89	207.52	9	171.33	169.37	.290
Throat	4	220.75	67.37	4	262.75	216.70	.724

Table 51
Presentation Time by Final Diagnosis (Men)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Marital status							
Married	27	301.78	443.56	118	237.14	250.59	.306
Single	5	332.80	278.61	15	257.07	260.10	.586
Widowed	6	283.17	270.54	9	279.00	344.21	.381
Divorced				4	145.75	99.60	
Day of week							
Weekday	11	443.00	365.49	59	316.10	281.01	.595
Weekend	29	232.00	388.88	95	201.55	221.97	.195
Onset time							
0001-0600	9	294.00	250.02	28	274.89	294.37	.862
0601-1200	18	333.61	504.49	54	293.59	284.37	.676
1201-1800	8	168.25	136.90	35	195.09	144.24	.635
1801-2400	5	320.80	449.88	37	200.49	238.22	.350
Risk Factors							
Smoking	10	249.90	260.74	38	266.63	227.99	.842
Diabetes	9	379.67	672.75	37	269.97	261.94	.432
Dyslipidemia	22	33.82	495.40	60	267.03	261.66	.743
Family History	15	324.20	544.79	50	270.18	256.97	.594
Hypertension	22	214.27	184.25	64	263.94	232.00	.366
Medical History							
Angina	8	309.88	314.44	41	255.22	240.10	.578
MI	14	199.14	188.40	55	252.51	229.36	.425
PTCA	2	73.50	20.51	31	299.48	243.33	.205
CABG	1	49.00		34	219.97	227.94	.465
CHF	1	74.00		11	361.45	347.35	.477
CVA	6	111.33	33.23	15	231.67	147.58	**.008**
Renal Insufficiency	9	306.67	286.98	7	200.57	119.30	.377
Renal failure	3	180.00	135.02	2	70.50	20.51	.359
TIA	2	497.50	402.34	5	134.20	55.59	.422
Arrhythmia	6	165.17	96.10	15	216.80	271.81	.659
Chief Complaint							
Chest pain							
Non specific	14	195.57	140.82	27	280.48	383.45	.301
Retrosternal	13	402.38	587.07	29	251.66	191.27	.382
Left sided	2	211.50	174.66	44	274.16	257.59	.737
Right sided	1	49.00		5	123.60	102.24	.542
Midsternal	3	191.33	179.29	23	175.35	157.35	.872
Epigastric pain	4	536.00	497.18	7	151.43	111.66	.220
Dyspnea	1	130.00		7	193.57	161.67	.726
Other	1	117.00		2	457.50	371.23	.076

Table 51 (Continued)
Presentation Time by Final Diagnosis (Men)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Associated symptoms							
Diaphoresis	22	185.27	169.63	49	250.45	242.21	.198
Dyspnea	16	330.63	529.60	62	238.16	239.39	.505
Dizziness	1	111.00		13	250.31	296.97	.659
Nausea	12	236.17	194.51	33	170.91	195.83	.328
Vomiting	3	445.33	307.43	5	105.80	75.15	.192
Weakness	4	112.50	59.22	6	153.83	168.56	.655
Syncope	2	204.00	12.73	1	85.00		.083
Other	7	273.29	271.35	35	212.40	189.49	.475
Descriptor							
Aching	3	1287.67	800.76	8	420.75	456.11	**.045**
Burning	2	573.00	336.58	3	91.67	23.63	.291
Crushing	3	160.00	71.72	12	201.00	153.34	.666
Heavy	8	157.38	112.85	14	231.11	236.25	.335
Pressure	2	106.50	3.54	8	94.38	64.77	.615
Sharp	1	782.00		16	192.50	206.11	**.014**
Squeezing	3	345.67	393.82	6	275.67	242.20	.746
Tight	4	214.50	136.23	10	292.70	335.20	.665
Other	2	122.50	38.89	5	131.20	111.65	.885
Radiation							
Back	2	51.00	24.04	12	199.08	181.01	.285
Jaw	3	229.67	95.13	10	231.40	139.00	.984
Left arm	13	299.92	331.10	48	271.98	211.54	.712
Left shoulder	2	201.50	188.80	12	247.50	151.85	.705
Neck	2	184.50	212.84	10	377.50	455.59	.582
Right arm	6	271.33	416.23	12	192.42	134.61	.549
Throat	1	109.00		3	362.67	150.16	.281

Table 52
Presentation Time by Age (Men)

Variable	N	> 65 yrs. Mean	SD	N	≤ 65 yrs. Mean	SD	p
Marital status							
Married	79	216.48	188.23	70	280.99	377.25	.198
Single	3	538.67	341.88	17	229.65	223.86	.054
Widowed	15	280.67	306.34				
Divorced				4	145.75	99.46	.425
Day of week							
Weekday	36	307.47	244.01	35	356.91	344.08	.595
Weekend	62	192.24	193.77	65	223.97	323.48	.195
Onset time							
0001-0600	27	259.78	248.36	11	308.00	356.04	.636
0601-1200	33	263.42	249.91	39	337.59	414377	.372
1201-1800	23	216.35	157.20	20	159.90	118.21	.196
1801-2400	15	153.67	164.85	33	243.27	299.18	.203
Risk Factors							
Smoking	16	354.13	229.65	32	217.66	223.44	.054
Diabetes	30	266.30	246.16	16	338.56	539.51	.535
Dyslipidemia	45	235.24	208.61	38	320.50	441.05	.280
Family History	27	249.19	220.55	38	306.42	406.30	.509
Hypertension	56	246.29	216.09	31	253.97	231.77	.877
Medical History							
Angina	32	319.25	281.44	17	160.41	132.89	**.010**
MI	52	231.12	229.83	18	262.06	197.06	.612
PTCA	24	277.75	245.00	9	307.22	246.55	.761
CABG	26	204.27	241.64	10	227.60	183.44	.785
CHF	11	363.18	345.71	1	55.00		.413
CVA	16	206.94	149.16	5	166.40	90.12	.575
Renal Insufficiency	14	273.21	241.18	2	169.50	116.67	.568
Renal failure	5	136.20	113.21				
TIA	6	265.17	257.60	1	75.00		.525
Arrhythmia	14	256.71	270.48	7	92.71	50.64	.133
Chief Complaint							
Chest pain							
Non specific	32	209.00	235.81	12	356.00	465.27	.315
Retrosternal	20	273.95	217.48	22	320.45	459.96	.683
Left sided	18	266.17	250.86	29	266.90	258.54	.992
Right sided	2	143.00	132.94	4	95.25	92.62	.625
Midsternal	15	201.47	166.94	11	144.09	140.93	.365
Epigastric pain	2	436.00	489.32	9	259.11	355.82	.541
Dyspnea	6	223.83	157.96	2	71.00	24.04	.243
Left arm/shoulder pain	2	195.00	103.24	2	323.00	329.52	.652
Other	1	117.00		2	45750	371.23	.591

Table 52 (Continued)
Presentation Time by Age (Men)

Variable	N	> 65 yrs. Mean	SD	N	≤ 65 yrs Mean	SD	p
Associated symptoms							
Diaphoresis	36	258.47	233.18	35	201.23	211.69	.283
Dyspnea	39	252.46	261.13	40	256.00	367.52	.959
Dizziness	5	402.60	416.00	9	150.22	149.72	.119
Nausea	23	212.57	204.78	22	162.95	186.52	.401
Vomiting	5	190.40	95.36	3	304.33	428.40	.692
Weakness	1	488.00		9	98.33	50.04	**<.001**
Syncope	2	211.00	74.95	1	342.00		.750
Other	20	317.80	227.12	22	135.95	130.52	**.004**
Descriptor							
Aching	5	326.40	213.69	6	932.83	799.10	.126
Burning	3	418.67	357.91	2	82.50	24.75	.297
Crushing	10	184.90	115.41	6	183.67	184.32	.987
Dull	5	245.20	140.31	5	480.20	387.86	.258
Heavy	13	232.31	216.35	9	164.00	178.88	.445
Pressure	6	112.50	60.41	4	73.25	50.57	.317
Sharp	6	286.67	360.77	12	182.25	165.49	.525
Squeezing	6	248.00	256.21	3	401.00	345.15	.472
Tight	8	15440	118.23	10	292.70	335.20	.353
Other				7	128.71	92.64	
Radiation							
Back	6	267.00	231.54	8	111.13	82.11	.166
Jaw	10	232.70	134.71	3	225.33	119.48	.934
Left arm	37	303.68	227.17	25	230.52	253.51	.240
Left shoulder	3	296.67	138.54	11	225.73	155.78	.490
Neck	5	308.80	314.76	7	371.43	511.16	.814
Right arm	11	181.91	138.71	7	276.57	378.54	.456
Throat	2	194.50	120.92	2	404.00	186.77	.314

Table 53
Presentation Time by Final Diagnosis (Women)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Marital status							
Married	7	291.86	166.87	70	191.11	247.82	.298
Single	2	224.00	270.12	12	215.25	297.81	.970
Widowed	9	226.33	168.32	28	231.64	234.61	.950
Divorced				11	297.73	342.67	
Day of week							
Weekday	5	173.80	149.85	34	192.85	202.84	.490
Weekend	13	281.46	171.67	94	225.68	282.30	.842
Onset time							
0001-0600	6	295.83	180.50	25	236.64	266.91	.612
0601-1200	7	196.00	118.61	43	155.53	143.63	.484
1201-1800	1	354.00		33	259.12	348.72	.790
1801-2400	4	256.75	254.31	27	245.04	282.60	.938
Risk Factors							
Smoking	1	286.00		17	246.18	278.04	.891
Diabetes	3	331.00	218.34	17	319.12	266.14	.943
Dyslipidemia	7	231.43	134.62	45	269.20	326.91	.766
Family History	7	244.86	145.02	40	225.85	241.31	.842
Hypertension	14	233.43	165.66	47	267.15	321.98	.708
Medical History							
Angina	1	373.00		32	225.97	203.66	.482
MI	4	218.25	148.82	24	307.96	308.77	.160
PTCA	1	317.00		8	302.50	297.51	.965
CABG	2	436.50	169.00	13	136.38	95.10	**.002**
CHF				7	255.43	172.20	
CVA	4	406.25	104.24	5	239.60	225.88	.219
Renal Insufficiency	1	117.00		7	209.57	191.94	.668
Renal failure	2	109.00	15.56				
TIA				1	171.00		
Arrhythmia	3	164.33	135.36	16	284.88	437.25	.649
Chief Complaint							
Chest pain							
Non specific	5	396.80	100.44	47	176.45	163.76	**.005**
Retrosternal	3	332.67	220.13	23	324.30	432.07	.974
Left sided	3	153.00	147.02	20	218.40	218.21	.624
Right sided				3	340.33	413.53	
Midsternal	1	74.00		19	157.95	151.43	.596
Epigastric pain	1	59.00		5	137.40	163.12	.683
Dyspnea	1	94.00		4	344.00	494.91	.682
Other	5	144.80	75.41				

Table 53 (Continued)
Presentation Time by Final Diagnosis (Women)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Associated symptoms							
Diaphoresis	5	280.80	205.37	40	264.90	344.90	.921
Dyspnea	9	258.11	185.63	59	209.20	246.72	.571
Dizziness	2	436.50	169.00	20	125.50	123.78	.003
Nausea	8	294.75	193.36	30	205.00	232.35	.323
Vomiting	2	84.00	35.36	2	11350	77.08	.671
Weakness	2	329.50	61.52	6	231.0	253.24	.622
Fatigue	1	286.00		3	135.33	90.78	.287
Syncope	1	264.00		2	250.00	130.11	.944
Other	7	223.43	180.33	45	200.93	228.56	.805
Descriptor							
Aching	1	98.00		3	178.33	44.66	.260
Burning	1	354.00		6	235.67	238.50	.665
Crushing				12	377.33	351.94	
Dull	1	415.00		3	219.00	245.98	.561
Heavy	2	245.00	181.02	23	197.87	178.95	.446
Pressure				10	389.00	540.47	.544
Sharp	2	320.50	4.95	8	206.50	228.89	.996
Squeezing	1	557.00		9	203.78	208.33	.641
Tight	3	67.00	38.63	9	84.33	66.54	.833
Other				3	241.00	233.82	.532
Radiation							
Back	3	239.67	114.75	16	141.88	188.41	.253
Jaw	1	286.00		10	105.60	64.87	.138
Left arm	6	272.00	198.40	35	166.74	155.20	.400
Left shoulder	2	350.50	91.22	10	319.30	313.68	.317
Neck	3	214.33	158.18	21	252.33	247.21	.554
Right arm	1	33.00		15	258.33	235.78	.464
Throat				5	169.20	103.37	.612

Table 54
Presentation Time by Age (Women)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Marital status							
Married	31	217.58	301.27	47	186.85	194.35	.585
Single	2	240.00	292.74	12	212.58	295.69	.905
Widowed	36	246.50	218.68	3	72.67	24.58	.182
Divorced	5	338.20	451.01	6	264.00	262.90	.741
Day of week							
Weekday	23	197.13	128.62	17	195.18	266.85	.413
Weekend	62	192.24	193.77	65	223.97	323.48	.976
Onset time							
0001-0600	13	226.00	208.29	20	266.10	271.34	.654
0601-1200	26	164.96	111.19	24	157.13	168.28	.846
1201-1800	19	299.63	427.82	15	214.13	197.19	.480
1801-2400	18	277.00	250.09	14	197.36	300.87	.420
Risk Factors							
Smoking	2	222.00	90.51	17	243.12	279.35	.918
Diabetes	14	299.36	259.67	6	371.17	257.20	.577
Dyslipidemia	34	307.68	305.72	19	194.68	187.20	.199
Family History	24	218.83	254.68	23	238.96	202.58	.766
Hypertension	45	272.44	313.38	17	234.71	227.30	.652
Medical History							
Angina	25	217.00	176.89	8	272.38	277.03	.509
MI	19	315.89	309.17	9	251.33	260.00	.593
PTCA	7	344.43	301.09	2	163.00	156.98	.453
CABG	12	156.33	110.45	3	256.67	259.66	.575
CHF	7	255.43	172.20				
CVA	7	381.86	156.80	2	75.00	66.47	**.036**
Renal Insufficiency	8	198.00	180.692				
Renal failure	1	120.00		1	98.00		
TIA	1	171.00					
Arrhythmia	16	319.88	429.35	4	89.75	101.52	.310
Chief Complaint							
Chest pain							
Non specific	27	193.81	172.64	26	198.08	170.45	.928
Retrosternal	17	323.65	454.42	10	270.10	308.22	.570
Left sided	10	189.00	131.43	13	225.92	257.53	.684
Right sided	2	499.00	436.99	1	23.00		.537
Midsternal	5	293.80	244.52	15	107.07	59.47	.163
Epigastric pain	2	48.50	14.85	4	162.25	177.09	.290
Dyspnea	3	118.67	59.94	2	557.00	739.63	.356
Other	5	144.80	75.41				

Table 54
Presentation Time by Age (Women)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Associated symptoms							
Diaphoresis	27	294.41	373.22	19	220.74	251.87	.459
Dyspnea	35	207.60	181.43	35	226.63	284.68	.740
Dizziness	12	130.33	90.34	10	181.90	208.50	.481
Nausea	23	182.52	156.68	15	287.33	297.42	.224
Vomiting	5	107.60	49.06				
Weakness	8	255.63	220.07				
Fatigue	4	173.00	105.69				
Syncope	2	211.00	74.96	1	342.00		.389
Other	27	209.41	232.00	25	198.08	213.67	.856
Descriptor							
Aching	1	190.00		4	137.25	54.12	.447
Burning	4	348.00	264.59	3	125.33	26.41	.215
Crushing	8	462.50	379.00	4	207.00	246.91	.254
Dull				4	268.00	223.48	
Heavy	12	213.75	181.80	13	158.62	173.82	.446
Pressure	6	463.67	619.56	6	279.50	365.00	.544
Sharp	2	228.50	125.16	8	229.50	230.49	.996
Squeezing	5	276.60	258.17	5	201.60	230.75	.641
Tight	7	76.71	30.02	5	84.60	91.50	.833
Other	1	60.00		2	331.50	245.37	.796
Radiation							
Back	8	214.00	252.40	11	116.09	96.45	.253
Jaw	8	144.88	81.43	3	61.00	53.36	.138
Left arm	22	202.45	160.63	19	158.63	168.50	.400
Left shoulder	5	222.40	205.20	7	397.43	326.01	.337
Neck	9	209.78	155.03	15	270.27	275.59	.554
Right arm	11	271.45	243.22	5	177.80	224.83	.464
Throat	3	201.00	66.84	2	121.50	161.93	.612

Treatment Phase

The treatment phase, sometimes referred to as "door to drug" time, has been subdivided into several time intervals, (door to triage, door to ECG, ECG to decision, door to doctor, and decision to drug) in order to assist in determining potential sources of delay in the Emergency Department.

Door to ECG

Door to ECG is calculated from the time the patient enters the hospital, to the time recorded on the ECG. Data on "door to ECG" was available from 504 (96%) of charts

and is displayed in Tables 55 to 63. Arrival time was recorded as the earliest time documented on either the Emergency Record or the Triage Form.

Mean "door to ECG" time for the entire sample was 27.09 ± 44.82 minutes with a median of 15.50 minutes, and a range of 1 to 365 minutes. The mean "door to ECG" time for men in the sample was 23.91 ± 37.75 minutes with a median of 14.00 minutes, while the mean for women was 31.38 ± 52.64 minutes, with a median of 17.00 minutes and a range of 1 to 354 minutes. The difference in door to ECG times for men and women was not found to be statistically significant ($p = .08$).

As noted above, "door to ECG" times for men and women were comparable, with the following exceptions. Women in the MI subgroup with a history of dyslipidemia had an ECG completed more quickly than their male counterparts ($t = 2.089$, $p = .046$), and men in the sample who complained of associated symptoms falling into the "other" category, received an ECG more swiftly than did women with similar symptoms ($t = 3.112$, $p = .017$).

Significant differences in "door to ECG" time on the basis of age were also relatively limited. Within the MI subgroup, patients with a chief complaint of non-specific chest pain had an ECG performed more quickly that did patients with other chief complaints ($t = 2.960$, $p = .004$) Patients over the age of 65 years in the total sample ($t = 2.648$, $p = .018$) and in the "men only" subgroup ($t = 3.203$, $p = .011$) who described their chest pain as "dull" had an ECG performed more rapidly than their younger cohorts. Those in the total sample with pain radiating to the jaw ($t = 2.342$, $p = .034$) and women with pain radiating to the neck ($t = 2.835$, $p = .008$) who were 65 years and over, had an ECG completed more quickly than those 65 years of age and younger with the same

complaints. The only significant difference noted on the basis of final diagnosis was women with a history of angina who received a final diagnosis other than MI had their ECG completed more quickly than those who had a MI ($t = 7.303$, $p = .005$).

Table 55
Door to ECG by Gender

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Age							
> 65 yrs.	131	21.53	40.00	109	31.92	58.21	.116
≤ 65 yrs.	158	25.88	35.79	106	30.82	46.50	.331
Marital Status							
Married	209	21.99	37.89	107	25.86	37.53	.389
Single	38	33.13	30.31	24	38.75	39.69	.531
Widowed	17	25.76	42.68	55	42.76	83.52	.424
Divorced	5	34.00	45.96	18	21.22	16.19	.572
Day of week							
Weekend	104	24.12	49.67	53	34.94	65.31	.249
Weekday	185	23.79	29.15	162	30.21	47.96	.128
Onset time							
0001-0600	39	18.56	23.33	33	13.91	9.48	.259
0601-1200	73	26.97	56.55	53	24.08	45.53	.759
1201-1800	44	21.50	22.61	33	30.82	35.51	.165
1801-2400	49	23.35	31.43	35	33.91	70.27	.354
Risk Factors							
Smoker	63	22.78	41.44	22	29.95	36.15	.473
Diabetes	67	27.81	51.47	24	33.33	60.48	.668
Dyslipidemia	117	21.14	35.08	68	23.84	43.70	.646
Family History	79	27.10	42.88	63	34.02	56.06	.406
Hypertension	123	22.64	39.16	83	31.10	51.11	.238
Medical History							
Angina	71	22.35	48.11	48	42.29	76.24	.112
MI	95	20.35	43.40	38	25.16	36.44	.547
PTCA	50	13.30	15.20	17	49.35	84.29	.098
CABG	50	13.56	13.80	15	12.07	7.62	.691
CHF	21	26.06	25.56	12	44.42	78.87	.450
Renal failure	9	9.11	5.09	2	9.50	3.54	.922
CVA	21	21.14	29.05	13	53.85	99.12	.267
Arrhythmia	33	26.48	37.01	22	30.14	26.69	.692

Table 55 (Continued)
Door to ECG by Gender

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Chief Complaint							
Chest pain:							
Nonspecific	73	22.97	30.91	79	29.22	51.15	.369
Retrosternal	57	18.44	18.97	39	32.38	52.05	.116
Left sided	71	25.17	49.83	31	42.26	73.42	.244
Right sided	7	19.43	19.61	5	11.40	6.50	.404
Midsternal	32	30.28	57.62	24	30.21	52.43	.996
Epigastric pain	16	26.00	24.51	10	20.20	13.08	.499
Dyspnea	16	25.56	29.60	7	12.86	7.34	.281
Palpitations	1	13.00		2	18.00	11.31	.780
Other	5	47.40	54.34	8	38.63	41.64	.748
Associated Symptoms							
Diaphoresis							
Dyspnea	110	30.83	52.27	92	29.40	51.71	.846
Dizziness	18	36.11	67.98	27	34.07	53.09	.911
Nausea	64	22.91	44.42	50	24.92	36.61	.796
Vomiting	10	11.10	8.60	7	14.71	7.32	.380
Palpitations	16	39.88	88.03	22	27.14	40.42	.553
Weakness	12	26.08	39.36	11	39.45	81.49	.617
Fatigue	4	14.50	9.33	7	63.43	99.90	.244
Syncope	6	29.00	53.15	4	23.75	15.20	.855
Other	66	19.17	21.62	80	37.49	63.09	**.017**
Descriptor							
Aching	15	20.47	24.15	7	63.57	65.82	.138
Burning	8	14.63	4.96	9	21.00	14.58	.259
Crushing	20	17.80	23.21	18	17.83	11.69	.996
Dull	11	21.73	17.48	6	21.83	13.95	.990
Heavy	30	26.10	34.46	34	40.82	78.70	.347
Indigestion	5	23.00	15.51	4	20.75	18.84	.538
Pressure	15	20.47	16.17	19	24.47	18.11	.507
Sharp	30	44.90	87.76	15	26.13	31.95	.429
Squeezing	12	9.83	7.50	14	33.36	69.12	.254
Tightness	21	22.33	21.13	15	22.40	18.38	.992
Other	9	25.56	29.66	7	21.57	5.00	.702
Radiation							
Back	20	18.20	21.34	25	16.32	11.52	.707
Jaw	17	14.24	11.12	14	20.29	14.49	.198
Left arm	81	23.33	48.02	53	26.92	39.91	.652
Left shoulder	17	23.35	30.42	17	13.71	11.59	.236
Neck	21	20.10	25.77	32	17.94	12.79	.687
Right arm	22	15.59	12.82	23	36.70	75.84	.201
Shoulders (bilateral)	4	31.50	20.29	7	45.71	67.54	.697
Throat	5	72.00	128.89	5	13.20	13.90	.367

Table 56
Door to ECG by Age

Variable	>65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Age							
Male	131	21.53	40.00	158	25.88	35.79	.330
Female	109	31.92	58.21	106	30.82	46.50	.879
Marital Status							
Married	144	23.23	42.28	172	23.36	33.62	.975
Single	9	30.67	21.47	53	36.09	35.84	.662
Widowed	69	34.84	67.59	3	128.67	191.89	.486
Divorced	9	15.56	10.76	14	29.43	29.83	.197
Day of week							
Weekend	78	25.65	57.76	79	39.86	53.40	.636
Weekday	162	26.53	44.82	185	27.01	33.52	.909
Onset time							
0001-0600	39	16.31	20.85	33	16.58	15.23	.951
0601-1200	60	25.10	27.77	66	26.35	46.63	.894
1201-1800	44	21.02	24.29	33	31.45	33.80	.119
1801-2400	37	30.05	52.01	47	25.94	51.04	.717
Risk Factors							
Smoker	18	22.72	37.74	67	25.15	40.91	.821
Diabetes	56	32.86	65.84	35	23.51	23.78	.422
Dyslipidemia	107	22.03	39.74	78	22.27	36.68	.966
Family History	61	22.44	29.69	81	35.99	59.23	.077
Hypertension	128	26.14	51.93	78	24.83	28.27	.838
Medical History							
Angina	81	34.84	72.30	38	20.92	25.15	.125
MI	89	24.12	49.23	44	16.86	16.73	.344
PTCA	46	26.41	55.15	21	13.76	10.80	.303
CABG	47	14.15	13.55	18	10.78	9.62	.338
CHF	29	50.34	86.53	4	16.25	11.33	.443
Renal Insufficiency	28	34.21	54.90	2	22.00	16.97	.760
Renal failure	7	7.43	4.32	4	12.25	4.03	.102
CVA	28	37.43	72.08	6	16.00	12.84	.478
Arrhythmia	37	24.30	26.49	18	35.44	43.53	.244
Chief Complaint							
Chest pain:							
Nonspecific	81	25.95	50.64	71	26.52	31.43	.935
Retrosternal	48	21.58	40.67	48	26.63	32.38	.503
Left sided	41	32.12	64.07	61	29.18	54.38	.804
Right sided	7	18.43	20.50	5	12.80	3.56	.562
Midsternal	25	33.20	56.33	31	27.87	54.65	.722
Epigastric pain	9	17.78	11.34	17	26.94	24.02	.200
Dyspnea	11	15.45	9.47	12	27.42	33.75	.260
Palpitations	1	10.00		2	19.50	9.19	.554
Other	8	29.63	42.70	5	61.80	45.39	.223

Table 56 (Continued)
Door to ECG by Age

Variable	>65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Associated Symptoms							
Diaphoresis	78	23.86	52.70	75	22.09	38.55	.814
Dyspnea	93	35.74	64.33	109	25.43	37.90	.177
Dizziness	18	37.78	63.63	27	32.96	56.43	.791
Nausea	61	23.39	37.61	53	24.25	44.98	.913
Vomiting	14	13.21	7.32	3	9.67	12.50	.507
Palpitations	21	32.10	77.46	17	33.00	44.75	.966
Weakness	11	38.36	81.89	12	27.08	38.96	.673
Fatigue	9	51.89	89.50	2	17.50	14.85	.615
Syncope	6	10.33	7.12	4	51.75	59.19	.256
Other	64	26.22	49.67	82	31.54	49.75	.522
Descriptor							
Aching	8	18.38	27.35	14	43.21	51.63	.224
Burning	8	13.63	6.44	9	21.89	13.53	.137
Crushing	23	19.17	22.99	15	15.73	7.71	.581
Dull	6	10.00	7.24	11	28.18	15.76	**.018**
Heavy	31	44.00	80.36	33	24.45	36.42	.222
Indigestion	3	21.33	22.90	6	22.33	14.05	.936
Pressure	15	20.67	13.36	19	24.32	19.84	.546
Sharp	17	33.71	85.87	28	41.64	67.36	.732
Squeezing	15	26.53	67.33	11	17.00	15.06	.650
Tightness	17	22.76	26.13	19	22.00	12.32	.910
Other							
Radiation							
Back	22	13.23	7.78	23	20.91	21.25	.116
Jaw	19	12.47	8.24	12	24.08	15.88	**.034**
Left arm	66	24.39	56.44	68	25.10	30.09	.928
Left shoulder	8	9.50	7.05	26	21.31	25.73	.213
Neck	23	15.26	23.38	30	21.50	14.25	.235
Right arm	29	31.07	68.44	16	17.88	11.74	.103
Shoulders (bilateral)	1	5.00		10	44.10	55.51	.519
Throat	5	12.40	7.13	5	72.80	128.97	.354

Table 57
Door to ECG by Final Diagnosis

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Gender							
Male	48	25.92	34.22	236	23.74	38.83	.718
Female	25	40.96	68.35	188	30.32	50.53	.459
Age							
> 65 yrs.	47	29.49	53.09	190	25.63	48.77	.633
≤ 65 yrs.	26	33.92	40.43	234	27.49	40.72	.445
Day of week							
Weekend	22	35.59	53.79	134	26.54	56.04	.482
Weekday	51	29.12	46.79	290	26.71	38.06	.688
Onset time							
0001-0600	18	18.39	17.65	52	15.92	19.03	.620
0601-1200	22	23.09	31.36	103	26.49	55.76	.783
1201-1800	10	20.20	32.83	67	26.28	28.59	.540
1801-2400	9	27.33	38.51	71	28.63	54.04	.945
Risk Factors							
Smoker	15	31.40	45.56	69	23.45	39.21	.491
Diabetes	20	29.10	38.24	71	29.31	57.54	.988
Dyslipidemia	33	21.09	29.04	150	22.55	10.43	.845
Family History	24	33.96	41.48	118	29.40	50.64	.680
Hypertension	48	32.08	53.63	156	23.89	41.41	.334
Medical History							
Angina	10	65.70	93.79	109	27.16	57.24	.231
MI	22	31.32	48.33	109	20.04	40.26	.249
PTCA	3	5.67	5.03	64	23.23	47.24	.525
CABG	3	10.67	4.51	60	13.52	13.05	.709
CVA	12	39.75	79.82	22	30.32	58.79	.696
CHF	3	93.67	94.77	30	41.47	80.67	.299
Renal Insufficiency	13	49.00	73.49	17	21.47	26.88	.164
Renal failure	5	8.80	4.92	6	9.50	4.93	.820
TIA	1	9.00		8	22.50	7.33	.126
Arrhythmia	9	18.67	10.71	46	29.76	35.63	.362
Chief Complaint							
Chest pain:							
Nonspecific	20	13.80	11.37	126	28.90	46.15	.149
Retrosternal	18	28.22	38.56	78	23.15	36.39	.600
Left sided	6	12.33	7.34	96	31.49	59.78	.437
Right sided	1	6.00		11	17.00	15.98	.525
Midsternal	6	70.17	105.28	20	25.46	45.18	.349
Epigastric pain	4	35.75	35.00	22	21.59	17.46	.216
General malaise	4	57.75	97.16	1	35.00		.848
Abdominal pain	1	4.00					
Right arm pain	1	12.00		1	21.00		
Back				5	17.00	13.06	
Left arm/shoulder				5	25.20	24.13	
Palpitations				3	16.33	8.51	
Dyspnea	8	38.63	38.08	15	12.67	6.47	.096

Table 57 (Continued)
Door to ECG by Final Diagnosis

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Associated Symptoms							
Diaphoresis	30	23.93	52.27	122	22.81	44.96	.906
Dyspnea	27	37.56	49.89	173	29.23	52.50	.442
Dizziness	2	13.00	2.83	43	35.91	59.93	.596
Nausea	26	32.81	52.04	87	21.26	37.28	.300
Vomiting	7	15.29	8.18	9	10.00	7.97	.214
Palpitations	1	11.00		37	33.08	64.89	.739
Weakness	7	25.86	49.57	16	35.38	67.97	.743
Fatigue	4	37.50	63.89	7	50.29	94.50	.817
Syncope	5	34.20	58.00	5	19.60	15.27	.601
Other	22	29.41	42.51	123	29.21	51.13	.986
Descriptor							
Aching	5	37.40	54.52	16	35.00	44.89	.922
Burning	3	13.67	1.16	14	18.93	12.32	.482
Crushing	4	43.67	59.00	34	15.85	10.07	.500
Dull	1	27.00		16	21.44	16.33	.746
Heavy	10	22.40	37.80	54	36.06	65.57	.527
Indigestion	1	3.00		8	24.38	15.27	.228
Pressure	1	22.00		31	23.35	17.76	.941
Sharp	3	14.00	2.65	42	40.40	76.38	.557
Squeezing	7	49.43	97.09	19	12.58	12.48	.355
Tightness	7	14.86	9.81	27	24.33	22.00	.279
Other	2	47.50	55.86	14	20.43	14.80	.617
Radiation							
Back	7	7.14	4.81	38	19.00	17.17	.079
Jaw	5	15.60	15.37	26	17.23	12.70	.801
Left arm	21	26.19	56.37	113	24.49	42.69	.874
Left shoulder	4	11.75	11.12	30	19.43	24.33	.542
Neck	6	10.67	8.17	47	19.83	19.58	.265
Right arm	9	43.78	85.03	36	22.03	45.90	.297

Table 58
Door to ECG by Gender (MI Subgroup)

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Age							
> 65 yrs.	28	20.36	29.94	19	42.95	74.42	.222
≤ 65 yrs.	20	33.70	38.90	6	34.67	49.23	.900
Day of week							
Weekend	15	26.67	35.94	7	54.71	80.54	.407
Weekday	33	25.58	33.97	18	35.61	64.79	.470
Onset time							
0001-0600	11	21.91	21.21	7	12.86	8.67	.303
0601-1200	15	28.00	37.14	7	12.57	5.74	.293
1201-1800	9	20.78	34.76	1	15.00		.879
1801-2400	5	37.40	51.08	4	14.75	9.74	.417
Risk Factors							
Smoker	12	16.75	20.88	3	90.00	75.35	.233
Diabetes	15	26.53	33.55	5	36.80	53.94	.617
Dyslipidemia	25	24.60	32.53	8	10.13	6.75	.046
Family History	16	35.19	42.80	8	31.50	41.43	.843
Hypertension	28	24.54	34.50	20	42.65	72.27	.308
Medical History							
Angina	7	24.43	28.58	3	162.00	131.39	.209
MI	16	27.88	33.21	6	40.50	79.76	.598
PTCA	2	3.00	2.83	1	11.00		.260
CABG	1	6.00		2	13.00	2.83	.293
CVA	6	28.17	49.01	6	51.33	106.26	.638
CHF	2	39.00	5.66	1	203.00		
Renal Insufficiency	8	23.00	11.12	5	90.60	111.68	.248
Renal failure	3	8.33	6.43	2	9.50	3.54	.835
TIA	1	9.00					
Arrhythmia	6	19.33	12.94	3	17.33	6.03	.811
Chief Complaint							
Chest pain:							
Nonspecific	14	12.00	11.59	6	18.00	10.57	.291
Retrosternal	14	23.64	31.83	4	44.25	59.96	.362
Left sided	3	10.33	8.08	3	14.33	7.57	.566
Right sided	1	6.00					
Midsternal	4	37.25	50.23	2	136.00	186.68	.590
Epigastric pain	3	40.00	41.58	1	23.00		.757
General malaise				4	57.75	97.16	
Abdominal pain				1	4.00		
Back				1	12.00		
Dyspnea	6	48.00	39.82	2	10.50	10.61	.256
Other	3	50.33	75.16	1	133.00		.441

Table 58 (Continued)
Door to ECG by Gender (MI Subgroup)

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Associated Symptoms							
Diaphoresis	24	15.83	27.56	6	56.33	103.81	.386
Dyspnea	16	32.75	39.62	11	44.55	63.44	.556
Dizziness				2	13.00	2.83	
Nausea	14	27.93	42.47	12	38.50	62.90	.616
Vomiting	5	15.00	8.69	2	16.00	9.90	.899
Palpitations	1	11.00					
Weakness	4	40.50	64.87	3	6.33	7.57	.416
Fatigue	1	13.00		3	45.67	75.64	.744
Syncope	4	37.75	66.24	1	20.00		.826
Other	12	23.17	34.55	10	36.90	51.41	.464
Descriptor							
Aching	3	13.67	10.60	2	73.00	86.27	.508
Crushing	3	43.67	59.00				
Tightness	4	12.25	11.30	3	18.33	8.08	.467
Burning	2	13.00		1	15.00		
Heavy	8	23.88	42.70	2	16.50	2.12	.821
Indigestion				1	3.00		
Squeezing	4	9.00	10.61	3	103.33	143.11	.372
Sharp	1	15.00		2	13.50	3.54	.788
Pressure	1	22.00					
Dull				1	27.00		
Other	2	47.50	55.86				
Radiation							
Back	4	5.50	3.11	3	9.33	6.51	.341
Jaw	4	18.75	15.78	1	3.00		.438
Left arm	14	13.79	11.90	7	51.00	95.96	.346
Left shoulder	2	8.50	6.36	2	15.00	16.97	.662
Neck	3	7.33	5.51	3	14.00	10.15	.374
Right arm	7	14.71	14.24	2	145.50	173.24	.479

Table 59
Door to ECG by Age (MI Subgroup)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Day of week							
Weekday	34	3.50	53.37	17	24.35	30.48	.612
Weekend	13	24.23	54.13	9	52.00	51.85	.243
Onset time							
0001-0600	9	11.67	8.22	9	25.11	22.21	.108
0601-1200	15	14.13	10.77	7	42.29	50.40	.192
1201-1800	8	23.75	36.24	2	6.00	1.41	.546
1801-2400	6	32.00	47.28	3	18.00	12.12	.640
Risk Factors							
Smoker	4	40.50	62.28	11	28.09	41.16	.658
Diabetes	13	31.69	44.58	7	24.29	24.80	.691
Dyslipidemia	20	16.75	25.12	13	27.77	34.27	.294
Family History	13	31.31	41.06	11	37.09	43.75	.742
Hypertension	34	33.00	59.76	14	29.86	38.66	.856
Medical History							
Angina	7	77.14	109.89	3	39.00	42.76	.586
MI	18	30.06	52.07	4	37.00	50.54	.802
PTCA	3	5.67	5.03				
CABG	2	8.50	3.54	1	15.00		.374
CVA	11	43.27	82.73	1	1.00		.635
Renal Insufficiency	13	49.00	73.49				
Renal failure	4	8.00	5.29	1	12.00		.547
Arrhythmia	9	18.67	10.71				
Chief Complaint							
Chest pain:							
Nonspecific	17	13.47	11.73	3	15.67	11.02	.767
Retrosternal	8	25.25	41.71	10	30.60	37.97	.780
Left sided	5	11.80	8.08	1	15.00		
Right sided	1	6.00					
Midsternal	3	135.33	12.33	3	5.00	1.73	.139
Epigastric pain	1	23.00		3	40.00	41.58	.757
Dyspnea	4	19.75	13.25	4	57.50	47.52	.211
General malaise	4	57.75	97.16				
Right arm pain							
Other	3	49.00	72.59	1	137.00		.405
Associated Symptoms							
Diaphoresis	20	24.10	57.97	10	23.60	41.33	.981
Dyspnea	18	37.50	54.05	9	37.67	43.34	.994
Dizziness	1	11.00		1	15.00		
Nausea	20	30.75	53.96	6	39.67	49.00	.721
Vomiting	6	13.83	7.91	1	24.00		.287
Weakness	3	6.33	7.57	4	40.50	64.87	.416
Fatigue	4	37.50	63.88				
Syncope	4	8.50	8.27	1	137.00		.001
Other	15	29.07	42.17	7	30.14	46.64	.957

Table 59 (Continued)
Door to ECG by Age (MI Subgroup)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Descriptor							
Aching	1	4.00		4	45.75	50.15	.573
Burning	3	13.67	1.16				
Crushing	3	43.67	59.00				
Heavy	7	28.43	44.35	3	8.33	10.21	.474
Pressure	1	22.00					
Sharp	2	13.00	2.83	1	16.00		.546
Squeezing	6	53.67	105.64	1	24.00		.805
Tightness	4	14.25	10.50	3	15.67	11.02	.869
Other				2	47.50	55.87	
Radiation							
Back	4	5.75	3.78	3	9.00	6.25	.426
Jaw	3	7.67	8.96	2	27.50	17.68	.182
Left arm	13	30.15	71.96	8	19.75	11.18	.692
Left shoulder	2	8.00	7.07	2	15.50	16.26	.610
Neck	4	10.25	9.85	2	11.50	6.36	.882
Right arm	5	60.20	116.49	4	23.25	13.25	.553

Table 60
Door to ECG by Final Diagnosis (Men)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Marital status							
Married	32	22.81	30.47	173	22.03	39.57	.916
Single	7	43.29	48.01	15	30.84	25.36	.528
Widowed	5	16.40	10.95	12	29.67	50.50	.576
Divorced	1	114.00		4	14.00	12.25	**.005**
Day of week							
Weekday	15	26.67	35.94	88	23.73	52.07	.747
Weekend	33	25.58	33.97	148	23.74	28.37	.834
Onset time							
0001-0600	11	21.91	21.21	27	17.63	24.73	.618
0601-1200	15	28.00	37.14	57	27.02	61.32	.953
1201-1800	9	20.78	34.76	35	21.69	19.02	.916
1801-2400	5	37.40	51.08	41	22.20	29.79	.326
Risk Factors							
Smoking	12	16.75	20.88	51	24.20	44.98	.580
Diabetes	15	26.53	33.55	52	28.17	55.85	.914
Dyslipidemia	25	24.60	32.53	90	20.47	36.20	.607
Family History	16	35.19	42.78	63	25.05	43.00	.402
Hypertension	28	24.54	34.50	93	22.39	40.97	.802
Medical History							
Angina	7	24.43	28.58	64	22.13	49.94	.905
MI	16	27.88	33.21	77	19.10	45.78	.469
PTCA	2	3.00	2.83	48	13.73	15.37	.333
CABG	1	6.00		47	13.96	14.14	.580
CHF	2	39.00	5.66	19	40.47	83.18	.981
CVA	6	28.17	49.01	15	18.33	17.83	.650
Renal Insufficiency	8	23.00	11.12	10	28.50	33.50	.636
Renal failure	3	8.33	6.43	6	9.50	4.93	.769
TIA	1	9.00		7	22.71	7.89	.155
Arrhythmia	6	19.33	12.94	27	28.07	40.49	.609
Chief Complaint							
Chest pain							
Non specific	14	12.00	11.59	54	26.78	64.67	.122
Retrosternal	14	23.64	31.83	43	16.74	12.43	.241
Left sided	3	10.33	8.08	68	25.82	50.81	.602
Right sided	1	6.00		6	21.67	20.48	.510
Midsternal	4	37.25	50.22	28	29.29	59.36	.801
Epigastric pain	3	40.00	41.58	13	22.77	20.06	.287
Dyspnea	6	48.00	39.82	10	12.10	6.51	.078
Other	2	7.00	5.66	3	74.33	56.31	.906

Table 60 (Continued)
Door to ECG by Final Diagnosis (Men)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Associated symptoms							
Diaphoresis	24	15.83	27.56	68	24.07	56.96	.499
Dyspnea	16	32.75	39.62	93	30.61	54.58	.881
Dizziness				18	36.11	67.98	
Nausea	14	27.93	42.47	49	21.76	45.71	.653
Vomiting	5	15.00	8.69	5	7.20	7.26	.162
Weakness	4	40.50	64.87	8	18.88	21.28	.558
Fatigue	1	13.00		3	15.00	11.36	.893
Syncope	4	37.75	66.24	2	11.50	6.36	.626
Other	12	23.17	34.55	53	18.17	18.08	.477
Descriptor							
Aching	3	13.67	10.60	12	22.17	26.57	.604
Burning	2	13.00		6	15.17	5.74	.631
Crushing	3	43.67	59.00	16	13.63	7.63	.471
Dull				11	21.73	17.48	
Heavy	8	23.88	42.70	22	26.91	32.08	.835
Pressure	1	22.00		13	21.23	17.13	.966
Sharp	1	15.00		29	45.93	89.13	.735
Squeezing	4	9.00	10.61	8	10.25	6.27	.800
Tight	4	12.25	11.30	15	25.07	23.93	.320
Other	2	47.50	55.86	7	19.29	21.12	.261
Radiation							
Back	4	5.50	3.11	16	21.38	22.82	.190
Jaw	4	18.75	15.78	13	12.85	9.68	.370
Left arm	14	13.79	11.89	67	25.33	52.39	.417
Left shoulder	2	8.50	6.36	15	25.33	31.92	.480
Neck	3	7.33	5.51	18	22.22	27.28	.368
Right arm	7	14.71	14.24	15	16.00	12.62	.833
Throat	1	22.00		4	84.50	145.28	.726

Table 61
Door to ECG by Age (Men)

Variable	N	> 65 yrs. Mean	SD	N	≤ 65 yrs. Mean	SD	p
Marital status							
Married	102	21.06	41.69	107	22.88	34.05	.729
Single	5	28.20	21.48	33	33.88	31.63	.702
Widowed	17	25.76	42.68				
Divorced	1	19.00		4	37.75	52.18	.769
Day of week							
Weekday	52	21.06	54.51	52	27.17	44.64	.433
Weekend	79	21.84	26.90	106	25.25	30.76	.533
Onset time							
0001-0600	26	18.81	24.91	13	18.08	20.73	.928
0601-1200	33	24.06	62.15	40	29.38	52.16	.692
1201-1800	25	19.16	22.55	19	24.58	22.93	.437
1801-2400	16	29.63	48.38	33	20.30	18.85	.467
Risk Factors							
Smoking	15	17.40	28.19	48	24.46	44.91	.569
Diabetes	38	31.37	65.51	29	23.14	23.11	.521
Dyslipidemia	62	18.52	26.19	55	24.09	43.03	.393
Family History	32	20.84	29.92	47	31.36	49.69	.287
Hypertension	70	22.24	48.05	53	23.17	23.12	.897
Medical History							
Angina	45	24.60	57.61	26	18.46	24.85	.608
MI	64	23.00	51.45	31	14.87	17.16	.395
PTCA	33	14.09	17.88	17	11.76	8.05	.613
CABG	35	14.57	15.06	15	11.20	10.33	.434
CHF	18	45.06	84.58	3	12.00	9.17	.516
CVA	17	23.12	31.93	4	12.75	8.50	.535
Renal Insufficiency	16	26.56	26.81	2	22.00	16.97	.820
Renal failure	6	7.50	4.72	3	12.33	4.93	.196
TIA	7	20.14	9.10	1	27.00		.507
Arrhythmia	20	19.40	23.04	13	37.38	50.99	.176
Chief Complaint							
Chest pain							
Non specific	41	17.85	20.06	32	29.53	40.25	.110
Retrosternal	27	15.22	23.38	30	21.33	13.66	.228
Left sided	26	35.04	77.35	45	19.47	21.45	.324
Right sided	3	27.67	30.86	4	13.25	3.95	.504
Midsternal	18	24.67	32.02	14	37.50	80.48	.541
Epigastric pain	5	16.20	11.95	11	30.45	27.82	.174
Dyspnea	7	17.57	9.69	9	31.78	38.38	.313
Left arm/shoulder pain	2	10.50	6.37	3	74.33	56.31	.549
Other	3	50.33	75.16	2	43.00	21.21	.906

Table 61 (Continued)
Door to ECG by Age (Men)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Associated symptoms							
Diaphoresis	47	20.45	54.38	45	23.47	47.63	.778
Dyspnea	51	33.47	57.04	59	28.54	48.15	.624
Dizziness	5	20.80	12.87	13	42.00	79.72	.563
Nausea	31	17.97	29.54	33	27.55	54.96	.393
Vomiting	7	11.71	7.57	3	9.67	12.50	.752
Weakness	1	6.00		11	27.91	40.75	.618
Fatigue	2	11.50	2.12	2	17.50	14.85	.629
Syncope	4	7.50	6.46	2	72.00	91.92	.502
Other	27	17.22	23.99	39	20.51	20.04	.547
Descriptor							
Aching	6	9.67	7.71	9	27.67	28.94	.165
Burning	4	12.00	5.03	4	17.25	3.69	.143
Crushing	11	21.64	30.79	9	13.11	7.06	.429
Dull	5	8.40	6.80	6	32.83	15.77	**.011**
Heavy	15	31.00	42.05	15	21.20	25.29	.446
Pressure	7	18.00	14.21	8	22.63	18.40	.599
Sharp	12	41.50	102.43	18	47.17	79.59	.866
Squeezing	8	7.88	6.33	4	13.75	9.03	.215
Tight	8	24.13	31.19	13	21.23	13.16	.769
Other	1	63.00		8	20.88	27.93	.198
Radiation							
Back	10	12.90	8.02	10	23.50	28.88	.289
Jaw	11	10.00	6.93	6	22.00	13.70	.088
Left arm	41	21.46	57.97	40	25.25	35.73	.725
Left shoulder	3	12.00	5.57	14	25.79	31.14	.494
Neck	11	19.64	33.14	10	20.60	15.98	.934
Right arm	12	12.25	11.86	10	19.60	13.39	.187
Throat	2	17.00	7.07	3	108.67	167.79	.517

Table 62
Door to ECG by Final Diagnosis (Women)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Marital status							
Married	8	45.63	89.97	98	24.46	30.27	.529
Single	3	22.67	4.51	21	41.05	42.01	.465
Widowed	13	35.15	61.33	41	45.80	90.80	.695
Divorced				18	21.22	16.19	
Day of week							
Weekday	7	54.71	80.54	46	31.93	63.20	.631
Weekend	18	35.61	64.79	142	29.80	45.94	.395
Onset time							
0001-0600	7	12.86	8.67	25	14.08	10.01	.771
0601-1200	7	12.57	5.74	46	25.83	48.65	.478
1201-1800	1	15.00		32	31.31	35.96	.658
1801-2400	4	14.75	9.74	30	37.43	75.41	.557
Risk Factors							
Smoking	3	90.00	75.35	18	21.33	13.95	.255
Diabetes	5	36.80	53.94	19	32.42	63.42	.889
Dyslipidemia	8	10.13	6.75	60	25.67	46.19	.349
Family History	8	31.50	41.43	55	34.38	58.18	.893
Hypertension	20	42.65	72.27	63	26.11	42.27	.341
Medical History							
Angina	3	162.00	131.39	45	34.31	66.20	**.004**
MI	6	40.50	79.76	32	22.28	22.47	.602
PTCA	1	11.00		16	51.75	86.46	.654
CABG	2	13.00	2.83	13	11.92	8.18	.860
CHF	1	203.00		11	43.18	80.08	.085
CVA	6	51.33	106.26	7	56.00	101.13	.647
Renal Insufficiency	5	90.60	111.68	7	11.43	6.53	.188
Renal failure	2	9.50	15.56				
TIA				1	171.00		
Arrhythmia	3	17.33	6.03	19	32.16	28.21	.384
Chief Complaint							
Chest pain							
Non specific	6	18.00	10.56	72	30.49	53.35	.571
Retrosternal	4	44.25	59.96	35	31.03	51.88	.637
Left sided	3	14.33	7.57	28	45.25	76.74	.498
Right sided				5	11.40	6.50	
Midsternal	2	136.00	186.68	22	20.59	13.72	.543
Epigastric pain	1	23.00		9	19.89	13.83	.836
General malaise							
Dyspnea	2	10.50	10.61	5	13.80	6.98	.636
Other	1	133.00		7	25.14	18.07	**.001**

Table 62 (Continued)
Door to ECG by Final Diagnosis (Women)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Associated symptoms							
Diaphoresis	6	56.33	103.81	54	21.22	22.56	.446
Dyspnea	11	44.55	63.44	80	27.63	50.28	.314
Dizziness	2	13.00	2.83	25	35.76	54.89	.570
Nausea	12	38.50	62.90	38	20.63	22.80	.354
Vomiting	2	16.00	9.90	4	13.50	8.35	.758
Weakness	3	6.33	7.57	8	51.88	9.94	.438
Fatigue	3	45.67	75.64	4	76.75	124.87	.722
Syncope	1	20.00		3	25.00	18.36	.835
Other	10	36.90	54.41	70	37.57	64.90	.975
Descriptor							
Aching	2	73.00	86.27	4	73.50	69.64	.994
Burning	1	15.00		8	21.75	15.40	.692
Crushing				18	17.83	11.69	
Dull	1	27.00		5	20.80	15.34	.731
Heavy	2	16.50	2.12	32	42.34	80.95	.659
Pressure				18	24.89	18.54	
Sharp	2	13.50	3.54	13	28.08	34.05	.568
Squeezing	3	103.33	143.11	11	14.27	15.66	.394
Tight	3	18.33	8.08	12	23.42	20.31	.685
Other				7	21.57	5.00	
Radiation							
Back	3	9.33	6.51	22	17.27	11.82	.272
Jaw	1	3.00		13	21.62	14.16	.229
Left arm	7	51.00	95.96	46	23.26	22.56	.475
Left shoulder	2	15.00	16.97	15	13.53	11.52	.873
Neck	3	14.00	10.15	29	18.34	13.11	.584
Right arm	2	145.50	173.24	21	26.33	59.41	.508
Throat				5	13.20	13.90	

Table 63
Door to ECG by Age (Women)

Variable	N	> 65 yrs. Mean	SD	N	≤ 65 yrs. Mean	SD	p
Marital status							
Married	42	28.50	43.74	65	24.15	33.15	.561
Single	4	33.75	24.31	20	39.75	42.51	.789
Widowed	52	37.81	74.05	3	128.67	191.89	.499
Divorced	8	15.13	11.42	10	26.10	18.28	.159
Day of week							
Weekday	26	34.85	63.91	27	35.04	67.86	.831
Weekend	83	31.00	56.69	79	29.38	36.98	.992
Onset time							
0001-0600	13	11.31	6.52	20	15.60	10.80	.209
0601-1200	27	26.37	53.06	26	21.69	37.05	.712
1201-1800	19	23.47	26.84	14	40.79	43.83	.170
1801-2400	21	30.38	55.80	14	39.21	89.85	.721
Risk Factors							
Smoking	3	49.33	72.60	19	26.89	29.43	.648
Diabetes	18	36.00	68.32	6	25.33	29.18	.717
Dyslipidemia	45	26.87	53.03	23	17.91	11.63	.428
Family History	29	24.21	29.86	34	42.38	70.65	.179
Hypertension	58	30.84	56.32	25	28.36	37.23	.840
Medical History							
Angina	36	47.64	86.45	12	26.25	26.06	.406
MI	25	27.00	43.82	13	21.62	15.26	.672
PTCA	13	57.69	95.26	4	22.25	17.69	.480
CABG	12	12.92	8.00	3	8.67	5.69	.408
CHF	11	59.00	93.12	1	29.00		.764
CVA	11	59.55	107.28	2	22.50	21.92	.647
Renal Insufficiency	12	44.42	78.87				
Renal failure	1	7.00		1	12.00		
TIA	1	21.00					
Arrhythmia	17	30.06	29.71	5	30.40	14.47	.981
Chief Complaint							
Chest pain							
Non specific	40	34.25	68.62	39	24.05	22.01	.379
Retrosternal	21	29.76	55.23	18	35.44	49.47	.739
Left sided	15	27.07	31.66	16	56.50	96.95	.265
Right sided	4	11.50	7.51	1	11.00		.956
Midsternal	7	55.14	94.90	17	19.94	13.77	.366
Epigastric pain	4	19.75	11.98	6	20.50	14.88	.935
Dyspnea	4	11.75	9.07	3	14.33	5.69	.686
Other	1	133.00		7	25.14	18.07	**.001**

Table 63
Door to ECG by Age (Women)

Variable	N	> 65 yrs Mean	SD	N	≤ 65 yrs Mean	SD	p
Associated symptoms							
Diaphoresis	31	29.03	50.48	30	20.03	18.49	.362
Dyspnea	42	38.50	72.83	50	21.76	19.92	.155
Dizziness	13	44.31	74.25	14	24.57	18.57	.344
Nausea	30	29.00	44.28	20	18.80	19.94	.340
Vomiting	7	14.71	7.32				
Weakness	10	41.60	85.57	1	18.00		.799
Fatigue	7	63.43	99.90				
Syncope	2	16.00	5.66	2	31.50	20.51	.411
Other	37	32.78	61.62	43	41.53	64.77	.540
Descriptor							
Aching	2	44.50	55.86	5	71.20	73.92	.671
Burning	4	15.25	8.02	5	25.60	17.81	.291
Crushing	12	16.92	13.53	6	19.67	7.47	.652
Dull	1	18.00		5	22.60	15.45	.799
Heavy	16	56.19	104.58	18	27.17	44.19	.315
Pressure	8	23.00	13.05	11	25.55	21.63	.772
Sharp	5	15.00	4.42	10	31.70	38.42	.206
Squeezing	7	47.86	97.65	7	18.86	18.06	.455
Tight	9	21.56	22.60	6	23.67	11.22	.837
Other	2	43.50	23.34	5	22.60	4.51	.439
Radiation							
Back	12	13.50	7.93	13	18.92	13.88	.248
Jaw	8	15.88	9.13	6	26.17	18.88	.259
Left arm	25	29.20	54.66	28	24.89	20.08	.699
Left shoulder	5	8.00	8.00	12	16.08	12.30	.199
Neck	12	11.25	7.62	20	21.95	13.72	.008
Right arm	17	44.35	87.44	6	15.00	8.65	.428
Throat	3	9.33	6.43	2	19.00	24.04	.670

Door to Doctor

Times for patient arrival to physician contact (door to doctor time) were available on 499 (95.6%) patients and are displayed in Tables 64 to 72. Door to doctor time is measured from the time the patents enters the Emergency Department until evaluated by a physician. As noted previously, arrival time was recorded as the earliest time documented on either the Emergency Record or the Triage Form. The earliest time recorded by the physician on the Emergency Record, or by an entry in the Nursing notes was used as the time the physician examined the patient.

Age and Gender. Mean "door to doctor" time for the sample was 51.24 ± 43.702 minutes, with a median of 41 minutes. Men were seen in an average of 45.86 ± 34.77 minutes with a median of 38.00 minutes, while women had a mean "door to doctor" time of 58.40 ± 52.57 minutes and a median time of 46.00 minutes (t = 3.027, p = .003). Within the MI subgroup men had a mean door to doctor time of 40.16 ± 37.79 minutes compared with 47.30 ± 34.22 minutes for women. Patients over the age of 65 years had a mean "door to doctor" time of 49.49 ± 41.88 minutes, while those 65 years and younger had a mean time of 53.44 ± 45.34 minutes. Patients with a final diagnosis of MI were seen in 42.38 ± 36.64 minutes, while their non-MI counterparts were seen in 52.76 ± 44.90 minutes (p = .061).

Comparisons on the basis of gender favor a reduced door to doctor time for men in 19 out of 20 (95%) examples that follow. When door to doctor times were compared for men and women, both over 65 years (t = 2.003, p = .047) and 65 years of age or less (t = 2.340, p = .020), men were seen more quickly by the physician than were women.

Marital Status. Men in the total sample were seen more quickly than women regardless of marital status, but only in the married category was the difference found to be statistically significant (t = 2.085, p = .039).

Day of the Week. Men were seen more quickly than women on the weekend, but during the week women (M = 40.43 ± 56.67) were evaluated more quickly than men (M = 47.22 ± 37.97) (t = 2.508, p = .013). There were no statistically significant differences based on age or final diagnosis.

Time of Day. Door to doctor times were similar for the 0601-1200 (M = 48.06 ± 36.95), 1201-1800 (M = 53.91 ± 52.753) and 1801-2400 (M = 51.99 ± 45.03) categories, but when the categories were compared, the average "door to doc" time for 0001-0600 (M = 38.99 ± 27.01) time period was significantly less than the others (t = 3.047, p = .003). During the same period, patients over the age of 65 years from the MI subgroup were seen by the physician more rapidly than their younger counterparts (t = 2.626, p = .015). In gender based comparisons, men in the total sample whose symptoms started in the 1801-2400 time period were seen by the physician sooner after arrival than were women (t = 2.001, p = .049). There were no significant differences based on final diagnosis.

Cardiac Risk Factors. As was discovered with presentation times, the sample was relatively homogeneous with respect to cardiac risk factors and "door to doc" times. In the total sample, men with a history of hypertension were seen by a physician more quickly than were women with a similar history (t = 2.091, p = .039). Furthermore, men with a final diagnosis of MI had a shorter "door to doc" time than did their non-MI counterparts (t = 2.030, p =. 045).

Medical History. Patients with a history of MI (t = 3.525, p < .001), PTCA (t = 3.747, p < .001), or CABG (t = 3.033, p = .003), were seen by a physician more quickly than patients without a similar history. Men in the sample had significantly lower "door to doc" times than women if they had a history of angina (t = 2.091, p = .039), renal insufficiency (t = 2.349, p = .026), CVA (t = 2.408, p = .026), or arrhythmia (t = 2.348, p = .024). Men in the MI subgroup enjoyed a similar advantage if they had a history of renal insufficiency (t = 4.911, p < .001) or arrhythmia (t = 3.185, p = .015).

Men over the age of 65 years were seen by a physician more quickly than their younger counterparts if they had a history of CVA (t = 2.225, p = .037) or CHF (t = 2.225, p = .037). Women with a history of renal insufficiency (t = 2.418, p = .036) or PTCA (t =3.556, p = .003) whose final diagnosis was not MI were seen more quickly than women with a final diagnosis of MI.

Chief Complaint. Patients with a chief complaint of palpitations were seen most quickly by a physician, followed by dyspnea, right sided chest pain, left sided chest pain, back pain, epigastric pain, general malaise, non-specific chest pain, midsternal chest pain, abdominal pain, left arm or shoulder pain, retrosternal chest pain, other presentations, and finally right arm pain. Men in the sample who complained of non-specific chest pain (t = 2.526, p = .013) or retrosternal chest pain (t = 2.162, p = .036) were seen sooner than women with the same complaints. Patients who presented with non-specific chest pain, and received a final diagnosis of MI were seen more quickly than those whose diagnosis was other than MI. There were no statistically significant differences in "door to doc" time using age as a comparator.

Associated Symptoms. Patients who complained of diaphoresis as part of their symptom constellation were seen by a physician more quickly than those who did not report diaphoresis (t = 3.084, p = .002). Men in the sample with symptoms classified as "other" (t = 3.112, p = .002), as well as men in the MI subgroup with diaphoresis (t = 2.223, p = .034) had a lower "door to doc" time than did their female counterparts.

Patients in the sample complaining of symptoms classified as "other" were seen by a physician more quickly if they were older than 65 years, as opposed to 65 years or

younger ($t = 2.116$, $p = .036$). There were no other statistically significant differences in "door to doctor" time on the basis of age.

Comparisons made on the basis of final diagnosis found that in both the total sample ($t = 2.314$, $p = .025$) and non-MI subgroup ($t = 3.580$, $p = .002$), dizziness was associated with a lower "door to doc' time in patients with a final diagnosis other than MI, compared to their MI counterparts. There were no other statistically significant differences in "door to doc" time based on final diagnosis.

The only statistically significant finding associated with patients' description of their chest pain was men who described their pain as "heavy" were seen by a physician, more quickly than women who provided the same description ($t = 4.007$, $p < .001$).

Men in the sample complaining of pain radiating to the jaw ($t = 2.600$, $p = .015$) or the left arm ($t = 2.149$, $p = .027$) were seen more quickly by a physician than women who provided a similar account.

Radiation of Pain

Patients in both the total sample ($t = 2.310$, $p = .032$) and the "men only" subgroup ($t = 2.759$, $p = .013$) with a final diagnosis of MI who complained of pain radiating to the back had a lower "door to doc" time than their non-MI counterparts.

Table 64
Door to Doctor by Gender

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Age							
> 65 yrs.	130	44.35	31.24	110	55.56	51.21	**.047**
≤ 65 yrs.	155	47.13	37.52	104	61.39	54.05	**.020**
Marital Status							
Married	206	44.96	34.62	108	56.46	51.60	**.039**
Single	35	59.54	38.04	24	86.46	82.10	.144
Widowed	18	43.33	28.95	54	55.67	46.06	.290
Divorced	5	35.20	35.71	18	47.11	24.64	.394
Day of week							
Weekend	103	43.46	28.24	52	52.06	36.75	.109
Weekday	182	47.22	37.97	162	40.43	56.67	**.013**
Onset time							
0001-0600	39	33.85	22.00	35	44.71	31.02	.084
0601-1200	76	44.33	33.99	51	53.61	4.068	.166
1201-1800	43	48.79	36.30	32	60.78	69.08	.334
1801-2400	47	45.66	38.75	35	67.14	58.39	**.049**
Risk Factors							
Smoker	65	44.34	36.73	21	52.86	28.36	.334
Diabetes	64	43.78	29.76	26	56.38	52.89	.155
Dyslipidemia	115	44.27	36.86	68	50.76	36.86	.330
Family History	81	50.42	36.55	59	61.15	48.00	.135
Hypertension	121	46.05	33.02	84	60.55	57.29	**.039**
Medical History							
Angina	66	40.32	30.42	46	53.17	34.66	**.040**
MI	91	39.68	27.00	40	47.05	29.63	.165
PTCA	47	37.09	26.45	17	40.12	28.49	.693
CABG	48	38.92	28.37	17	43.47	26.81	.566
CHF	21	49.38	37.48	12	48.25	39.78	.936
Renal Insufficiency	19	31.37	27.73	12	58.67	36.88	**.026**
Renal failure	8	40.00	16.54	3	36.67	41.36	.844
CVA	23	32.83	20.45	14	55.64	31.66	**.026**
Arrhythmia	32	44.94	32.85	23	71.70	47.03	**.024**
Chief Complaint							
Chest pain:							
Nonspecific	70	42.69	31.96	76	58.38	40.91	**.013**
Retrosternal	57	47.58	29.17	39	75.00	75.43	**.036**
Left sided	67	38.15	25.04	31	60.10	65.79	.081
Right sided	7	55.43	40.58	6	30.33	17.37	.174
Midsternal	33	54.45	51.04	25	50.08	34.70	.714
Epigastric pain	18	52.22	38.00	10	43.00	11.02	.348
Dyspnea	15	37.07	25.11	7	34.14	28.95	.811
Palpitations	1	33.00		2	25.50	6.36	.512
Other	5	87.80	81.20	7	43.14	28.39	.294

Table 64 (Continued)
Door to Doctor by Gender

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Associated Symptoms							
Diaphoresis	91	39.41	32.75	61	48.72	39.26	.115
Dyspnea	109	47.28	40.15	93	58.84	38.15	.124
Dizziness	19	42.11	27.29	27	56.11	32.30	.131
Nausea	63	42.27	34.42	47	50.81	40.45	.235
Vomiting	10	26.70	14.96	7	52.00	27.95	.059
Palpitations	16	55.38	50.68	22	52.55	46.23	.859
Weakness	10	40.20	36.81	12	40.50	29.05	.983
Fatigue	4	49.75	29.70	6	91.17	95.35	.432
Syncope	6	33.00	46.20	3	47.00	22.61	.643
Other	63	39.71	34.83	76	61.75	48.46	**.002**
Descriptor							
Aching	14	44.36	28.66	6	112.00	126.03	.248
Burning	9	57.67	30.79	9	44.22	34.67	.397
Crushing	19	58.42	48.54	12	71.83	88.30	.568
Dull	10	40.90	24.65	7	50.14	47.79	.607
Heavy	26	30.96	22.03	32	67.00	44.62	**<.001**
Indigestion	5	40.40	41.56	4	34.00	18.78	.572
Pressure	16	34.56	28.34	20	66.20	60.39	.062
Sharp	30	52.13	33.27	13	82.69	55.91	.085
Squeezing	12	51.42	48.32	14	56.93	25.84	.714
Tightness	22	45.00	31.04	16	43.00	14.67	.793
Other	9	37.44	30.06	7	52.29	49.60	.470
Radiation							
Back	20	49.75	32.94	26	66.12	74.80	.367
Jaw	17	35.41	20.68	14	57.43	26.48	**.015**
Left arm	82	41.90	26.53	53	53.21	31.82	**.027**
Left shoulder	16	39.69	34.48	15	56.93	29.01	.144
Neck	20	36.15	28.10	32	48.59	31.12	.152
Right arm	21	40.57	26.48	22	47.87	28.70	.387
Shoulders (bilateral)	4	43.25	28.31	7	74.14	64.72	.396
Throat	6	46.00	42.39	5	43.80	29.98	.925

Table 65
Door to Doctor by Age

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Age							
Male	130	44.35	31.24	155	47.13	37.52	.502
Female	110	55.56	51.21	104	61.39	54.05	.419
Marital Status							
Married	144	46.23	42.82	170	51.19	40.40	.293
Single	9	79.22	43.61	50	68.92	63.65	.644
Widowed	69	52.71	42.57	3	49.67	52.55	.905
Divorced	9	50.11	24.68	14	40.93	28.61	.438
Day of week							
Weekend	79	43.57	30.31	76	49.22	32.64	.265
Weekday	161	52.39	46.33	183	54.37	49.68	.704
Onset time							
0001-0600	140	49.24	39.39	144	53.81	50.03	.393
0601-1200	118	47.12	40.66	113	51.89	49.16	.421
1201-1800	41	47.61	40.69	34	61.50	64.23	.259
1801-2400	37	59.27	50.11	45	51.18	48.27	.460
Risk Factors							
Smoker	18	46.61	28.22	68	46.37	36.66	.979
Diabetes	57	43.89	32.13	33	53.52	46.42	.523
Dyslipidemia	104	47.61	48.34	79	45.47	36.30	.743
Family History	61	54.80	36.86	79	55.05	45.70	.973
Hypertension	128	48.94	45.16	77	57.06	44.65	.212
Medical History							
Angina	80	47.26	32.54	32	41.44	33.26	.397
MI	89	42.56	29.02	42	40.60	25.73	.708
PTCA	45	38.60	28.26	19	36.21	23.64	.747
CABG	45	39.04	24.46	20	42.50	34.87	.648
CHF	29	44.48	35.47	4	81.50	42.68	.065
Renal Insufficiency	29	43.14	34.47	2	24.50	19.09	.460
Renal failure	8	34.13	21.39	3	52.33	26.76	.266
CVA	30	38.33	26.46	7	54.86	28.60	.151
Arrhythmia	38	59.74	43.03	17	48.06	36.72	.336
Chief Complaint							
Chest pain:							
Nonspecific	78	47.14	32.95	68	55.38	42.05	.187
Retrosternal	49	64.20	65.58	47	53.00	39.51	.316
Left sided	40	46.08	28.75	58	44.41	51.15	.853
Right sided	7	41.43	30.27	6	46.67	39.60	.792
Midsternal	27	54.81	43.98	31	50.61	45.45	.723
Epigastric pain	10	38.00	17.85	18	55.00	35.53	.104
Dyspnea	11	31.09	24.23	11	41.18	27.32	.370
Palpitations	1	21.00		2	31.50	2.12	.154
Other	7	29.29	12.11	5	107.20	67.90	.062

Table 65 (Continued)
Door to Doctor by Age

Variable	> 65 yrs. N	Mean	SD	< 65 yrs. N	Mean	SD	p
Associated Symptoms							
Diaphoresis	78	40.56	27.34	74	45.86	42.77	.362
Dizziness	20	52.52	29.02	26	48.88	32.62	.722
Dyspnea	95	48.35	33.44	107	53.77	43.98	.323
Nausea	60	44.23	34.78	50	47.94	40.14	.605
Vomiting	14	38.50	26.29	3	30.67	10.02	.411
Palpitations	21	46.38	29.41	17	62.82	63.07	.333
Weakness	12	41.17	28.50	10	39.40	37.31	.901
Fatigue	8	75.63	85.57	2	70.50	30.41	.938
Syncope	6	21.67	13.90	3	69.67	57.07	.281
Other	62	43.47	31.36	77	58.44	51.34	**.036**
Descriptor							
Aching	7	26.00	17.46	13	85.46	87.27	.095
Burning	8	37.38	31.27	10	61.80	30.77	.116
Crushing	22	71.59	86.20	15	55.20	36.04	.492
Dull	6	38.67	19.15	11	48.00	41.65	.615
Heavy	27	54.33	41.82	31	47.81	39.33	.543
Indigestion	3	35.00	22.87	6	38.83	37.37	.877
Pressure	17	39.65	24.45	19	63.32	64.83	.166
Sharp	18	56.67	30.43	25	64.76	50.68	.518
Squeezing	15	54.20	24.52	11	54.64	51.13	.977
Tightness	17	49.47	27.46	21	39.86	22.98	.248
Other	3	64.00	39.15	13	39.31	39.05	.470
Radiation							
Back	23	71.22	76.90	23	46.78	34.74	.172
Jaw	19	44.89	26.03	12	46.08	26.08	.902
Left arm	66	43.39	25.54	69	49.16	32.14	.252
Left shoulder	8	54.38	34.83	23	45.83	32.33	.532
Neck	22	40.64	22.27	30	46.13	35.08	.524
Right arm	28	41.79	23.22	16	48.94	34.24	.414
Shoulders (bilateral)	1	46.00		10	64.60	57.40	.764
Throat	5	45.60	27.30	6	44.60	43.84	.962

Table 66
Door to Doctor by Final Diagnosis

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Gender							
Male	51	40.16	37.79	230	47.23	34.17	.190
Female	23	47.30	34.22	188	59.52	54.62	.297
Age							
> 65 yrs.	48	40.75	37.97	189	51.35	42.81	.119
< 65 yrs.	26	45.38	34.56	229	53.92	46.63	.367
Day of week							
Weekend	22	44.59	24.76	131	46.40	31.99	.804
Weekday	52	41.44	39.42	287	55.66	49.47	.051
Onset time							
0001-0600	18	33.56	20.71	54	39.72	28.35	.399
0601-1200	25	47.12	40.46	101	48.45	36.39	.874
1201-1800	10	50.60	60.34	65	54.42	52.00	.833
1801-2400	9	35.33	21.87	69	57.51	51.88	.211
Risk Factors							
Smoker	13	31.77	29.19	72	48.54	35.37	.111
Diabetes	20	41.75	34.02	70	49.04	39.17	.452
Dyslipidemia	35	42.14	40.26	146	47.89	44.52	.486
Family History	24	59.58	44.92	116	53.98	41.43	.553
Hypertension	47	40.81	33.08	156	55.54	47.86	**.050**
Medical History							
Angina	11	39.18	22.08	101	46.30	33.67	.496
MI	23	41.86	32.04	107	42.17	27.24	.889
PTCA	3	55.33	52.37	61	37.03	25.44	.607
CABG	3	60.00	47.66	61	39.26	27.01	.214
CVA	13	40.23	34.56	24	42.13	23.22	.843
CHF	3	43.00	36.59	30	49.57	38.38	.779
Renal Insufficiency	14	43.29	36.71	17	40.82	32.32	.844
Renal failure	5	39.60	31.81	6	38.67	16.18	.951
TIA	2	20.00	15.56	8	34.38	15.56	.186
Arrhythmia	9	52.56	41.06	45	57.11	42.08	.767
CABG list	1	1.00		4	60.00	31.70	.195

Table 66 (Continued)
Door to Doctor by Final Diagnosis

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Chief Complaint							
Chest pain:							
Nonspecific	21	33.52	29.32	121	53.94	38.37	**.022**
Retrosternal	18	45.39	31.71	77	62.03	58.48	.247
Left sided	6	53.33	41.53	91	44.71	43.74	.640
Right sided	1	31.00		12	44.92	34.70	.707
Midsternal	6	64.50	69.52	52	51.19	69.52	.492
Epigastric pain	5	33.20	29.61	23	52.35	31.02	.219
General malaise	4	50.00	42.84	2	52.00	35.36	.958
Abdominal pain	1	17.00					
Right arm pain	1	82.00		1	87.00		
Back				5	45.20	27.96	
Left arm/shoulder				6	56.33	37.25	
Palpitations				3	28.00	6.25	
Dyspnea	8	43.97	37.68	14	40.07	26.48	.355
Other	3	59.33	59.21	9	62.56	61.23	.938
Associated Symptoms							
Diaphoresis	31	36.58	31.87	120	44.43	36.42	.275
Dyspnea	26	48.50	42.77	173	51.32	39.16	.736
Dizziness	3	88.33	47.06	43	47.67	28.31	**.025**
Nausea	25	48.08	46.17	84	45.44	34.58	.758
Vomiting	7	33.29	20.31	9	34.00	21.39	.947
Palpitations	1	115.00		37	52.08	47.03	.195
Weakness	7	57.71	45.72	15	32.27	20.44	.201
Fatigue	3	58.67	39.12	7	81.43	89.51	.691
Syncope	5	40.60	49.35	4	34.00	27.38	.819
Other	20	39.90	36.40	119	53.76	44.99	.194
Descriptor							
Aching	4	53.75	26.18	15	66.27	87.16	.784
Burning	3	28.33	27.01	15	55.47	32.42	.196
Crushing	3	96.33	88.93	34	62.18	69.10	.426
Dull	1	50.00		16	44.38	36.05	.882
Heavy	10	36.90	35.66	48	53.75	40.92	.232
Indigestion	1	44.00		8	36.75	33.83	.846
Pressure	2	16.00	21.21	31	54.10	53.23	.328
Sharp	4	74.25	46.32	38	60.84	43.49	.563
Squeezing	7	46.86	19.72	19	57.16	41.95	.542
Tightness	7	37.00	32.77	30	44.67	23.10	.470
Other	2	15.50	20.51	14	48.00	39.79	.286
Radiation							
Back	7	30.00	28.62	39	64.21	36.17	**.032**
Jaw	5	43.60	15.58	26	45.69	27.35	.870
Left arm	22	43.91	28.74	112	46.96	29.41	.656
Left shoulder	4	37.75	24.26	27	49.56	33.78	.509
Neck	6	35.67	28.86	46	44.87	30.66	.490
Right arm	9	40.00	28.47	35	45.51	27.63	.598
Shoulders (bilateral)				11	62.91	54.74	
Throat	1	31.00		10	46.40	37.09	.701

Table 67
Door to Doctor by Gender (MI Subgroup)

Variable	Men N	Men Mean	Men SD	Women N	Women Mean	Women SD	p
Age							
> 65 years	30	37.87	38.99	18	45.56	36.82	.503
< 65 years	21	43.43	36.73	5	53.60	24.84	.565
Day of week							
Weekday	35	37.94	40.29	17	48.65	37.71	.363
Weekend	16	45.00	32.39	6	43.50	24.06	.919
Onset time							
0001-0600	11	31.82	19.61	7	36.29	23.66	.669
0601-1200	18	43.50	38.71	7	56.43	46.50	.485
1201-1800	9	56.11	61.28	1	1.00		.418
1801-2400	5	36.60	27.46	4	33.75	16.26	.861
Risk Factors							
Smoker	12	30.75	30.25	1	44.00		.682
Diabetes	16	41.38	31.15	4	43.25	49.76	.925
Dyslipidemia	27	40.26	42.72	8	48.50	33.39	.618
Family History	17	57.18	48.34	7	65.43	38.06	.692
Hypertension	28	35.18	30.79	19	49.11	35.39	.159
Medical History							
Angina	8	36.00	21.21	3	47.67	26.73	.464
MI	17	35.12	26.72	6	58.67	41.74	.124
PTCA	2	25.50	12.02	1	115.00		.104
CABG	1	31.00		2	74.50	57.28	.647
CVA	7	25.00	14.90	6	58.00	43.56	.127
Renal Insufficiency	10	25.00	21.85	4	89.00	22.55	**<.001**
Renal failure	3	38.33	19.43	2	41.50	57.28	.951
Arrhythmia	6	31.50	25.54	3	94.67	33.50	**.015**
Chief Complaint							
Chest pain:							
Nonspecific	15	32.27	31.42	6	36.67	25.66	.765
Retrosternal	15	39.87	27.90	3	73.00	41.58	.099
Left sided	3	47.33	43.36	3	59.33	48.21	.765
Right sided	1	31.00	-				
Midsternal	4	73.75	86.29	2	46.00	28.28	.695
Epigastric pain	4	27.50	30.86	1	56.00		.469
Dyspnea	6	35.00	25.08	2	12.00	15.56	.281
General malaise				4	50.00	42.84	
Right arm pain				2	84.50	3.54	
Other	3	59.33	59.21				

Table 67 (Continued)
Door to Doctor by Gender (MI Subgroup)

	Men			Women			
Variable	N	Mean	SD	N	Mean	SD	p
Associated Symptoms							
Diaphoresis	25	30.72	28.67	6	61.00	35.51	.034
Dyspnea	16	44.06	45.95	10	55.60	38.38	.515
Dizziness	1	116.00	-	2	74.50	57.28	.660
Nausea	14	46.64	53.70	11	49.91	36.88	.865
Vomiting	5	29.20	21.63	2	43.50	17.68	.451
Weakness	4	60.00	53.62	3	54.67	43.98	.894
Fatigue	1	29.00		2	73.50	41.72	.544
Syncope	4	41.75	56.91	1	36.00		.934
Other	12	37.75	32.60	8	43.13	44.87	.759
Descriptor							
Aching	3	44.33	22.28	1	82.00		.281
Burning	2	42.00	18.39	1	1.00		.320
Crushing	3	96.33	88.93				
Heavy	8	29.88	26.36	2	65.00	67.88	.596
Pressure	2	16.00	21.21				
Sharp	2	53.00	62.23	2	95.50	27.58	.470
Squeezing	4	39.50	15.56	3	56.67	23.44	.293
Tightness	4	35.00	44.74	3	39.67	14.15	.871
Other	2	15.50	20.51				
Radiation							
Back	4	14.75	23.60	3	50.33	23.16	.103
Jaw	4	43.50	17.99	1	44.00		.982
Left arm	15	43.00	32.30	7	45.86	21.20	.834
Left shoulder	2	28.50	37.48	2	47.00	4.24	.560
Neck	3	20.67	29.84	3	50.67	22.75	.238
Right arm	7	37.43	30.82	2	49.00	24.04	.645

Table 68
Door to Doctor by Age (MI Subgroup)

Variable	> 65 yrs. N	Mean	SD	≤ 65years N	Mean	SD	p
Gender							
Male	130	44.35	31.24	155	47.13	37.52	.495
Female	110	55.56	51.21	104	61.39	54.05	.419
Day of week							
Weekday	34	41.97	42.29	18	40.44	34.46	.896
Weekend	14	37.79	25.67	8	56.50	34.33	.161
Onset time							
0001-0600	9	29.78	21.22	9	37.33	20.71	.456
0601-1200	17	34.06	35.26	8	74.88	38.44	**.015**
1201-1800	8	61.13	36.62	2	8.50	3.54	.296
1801-2400	6	31.33	13.44	3	43.33	36.30	.629
Risk Factors							
Smoker	3	46.33	17.62	10	27.40	31.23	.346
Diabetes	12	36.33	34.20	8	49.88	34.33	.398
Dyslipidemia	21	41.67	44.21	14	42.86	35.10	.933
Family History	12	69.17	50.97	12	50.00	37.69	.306
Hypertension	33	38.91	30.88	14	45.29	38.65	.551
Medical History							
Angina	8	41.50	22.68	3	33.00	23.64	.597
MI	19	39.11	32.16	4	51.50	34.00	.495
PTCA	3	55.33	52.37				
CABG	2	73.00	59.40	1	34.00		.687
CVA	12	40.75	36.05	1	34.00		.860
Renal Insufficiency	14	43.29	36.72				
Renal failure	4	29.00	24.50	1	82.00		.148
Arrhythmia	9	52.56	41.06				
Chief Complaint							
Chest pain:							
Nonspecific	17	29.00	24.06	4	52.75	45.10	.149
Retrosternal	9	40.00	34.53	9	50.78	29.66	.488
Left sided	5	58.40	44.32	1	28.00		.565
Right sided	1	31.00					
Midsternal	3	106.00	80.80	3	23.00	19.67	.213
Epigastric pain	2	32.50	33.23	3	33.67	34.65	.973
Dyspnea	4	31.75	27.97	4	26.75	24.39	.797
General malaise	4	50.00	42.84				
Other	2	26.50	23.34	1	125.00		.180

Table 68 (Continued)
Door to Doctor by Age (MI Subgroup)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Associated Symptoms							
Diaphoresis	21	36.86	28.63	10	36.00	69.54	.946
Dyspnea	18	50.94	48.67	8	43.00	27.07	.671
Dizziness	1	115.00		2	75.00	57.98	.673
Nausea	19	47.53	49.56	6	49.83	37.22	.918
Vomiting	6	32.00	21.94	1	41.00		.720
Weakness	3	54.67	43.98	4	60.00	53.62	.894
Fatigue	3	58.67	39.12				
Syncope	4	19.50	16.70	1	125.00		**.011**
Other	14	38.86	37.25	6	42.33	39.59	.853
Descriptor							
Aching	1	30.00		3	61.67	25.54	.395
Burning	3	28.33	27.01				
Crushing	3	96.33	88.93				
Heavy	7	36.29	37.51	3	38.33	38.68	.939
Pressure	2	16.00	21.21				
Sharp	3	73.67	56.72	1	76.00		.975
Squeezing	6	47.83	21.41	1	41.00		.780
Tightness	4	30.00	22.52	3	46.33	47.25	.564
Other				2	15.50	20.51	
Radiation							
Back	4	31.50	21.82	3	28.00	41.62	.889
Jaw	3	53.33	11.37	2	29.00	1.41	.065
Left arm	13	41.15	23.73	9	47.89	35.96	.601
Left shoulder	2	49.50	7.78	2	26.00	33.94	.441
Neck	4	33.00	23.31	2	41.00	49.50	.787
Right arm	5	36.00	24.30	4	45.00	36.25	.668

Table 69
Door to Doctor by Final Diagnosis (Men)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Marital status							
Married	34	41.41	41.38	169	45.72	33.32	.510
Single	7	56.00	34.02	28	60.43	39.51	.788
Widowed	6	35.00	21.17	12	47.50	32.17	.404
Divorced	1	11.00		4	41.25	38.16	.529
Day of week							
Weekday	16	45.00	32.35	88	23.73	52.07	.096
Weekend	35	37.94	40.29	144	49.91	37.43	.771
Onset time							
0001-0600	11	31.82	19.61	28	34.64	23.15	.723
0601-1200	18	43.50	38.71	57	44.81	33.00	.889
1201-1800	9	56.11	61.28	34	46.85	27.36	.669
1801-2400	5	36.60	27.46	39	47.10	40.84	.581
Risk Factors							
Smoking	12	30.75	30.25	53	47.42	37.61	.157
Diabetes	16	41.38	31.15	48	44.58	29.58	.712
Dyslipidemia	27	40.26	42.47	87	45.66	35.31	.510
Family History	17	57.18	48.34	64	48.63	32.97	.395
Hypertension	28	35.18	30.79	92	49.51	33.26	**.045**
Medical History							
Angina	8	36.00	21.21	58	40.91	31.58	.672
MI	17	35.12	26.72	73	40.85	27.30	.436
PTCA	2	25.50	12.02	45	37.60	26.86	.533
CABG	1	31.00		46	39.24	28.95	.780
CHF	2	34.50	47.38	19	50.95	37.54	.568
CVA	7	25.00	14.90	16	36.25	21.98	.233
Renal Insufficiency	10	25.00	21.85	9	38.44	32.95	.305
Renal failure	3	38.33	19.43	5	41.00	16.93	.844
TIA	2	20.00	15.56	5	34.43	13.05	.222
Arrhythmia	6	31.50	25.54	26	48.04	33.98	.273
Chief Complaint							
Chest pain							
Non specific	15	32.27	31.42	52	46.04	32.03	.146
Retrosternal	15	39.87	27.90	42	50.33	29.44	.236
Left sided	3	47.33	43.36	63	37.84	24.53	.528
Right sided	1	31.00		6	59.90	42.86	.565
Midsternal	4	73.75	86.29	29	51.79	46.03	.429
Epigastric pain	4	27.50	30.86	14	59.09	37.76	.145
Dyspnea	6	35.00	25.08	9	38.44	26.54	.805
Other	2	26.50	23.34	3	128.67	81.56	.198

Table 69 (Continued)
Door to Doctor by Final Diagnosis (Men)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Associated symptoms							
Diaphoresis	25	30.72	28.67	66	42.70	33.78	.120
Dyspnea	16	44.06	45.95	92	47.49	39.40	.755
Dizziness	1	116.00		18	38.00	21.21	**.002**
Nausea	14	46.64	53.70	48	41.21	27.50	.610
Vomiting	5	29.20	21.63	5	24.20	4.49	.637
Weakness	4	60.00	53.62	6	27.00	13.84	.308
Fatigue	1	29.00		3	56.67	32.19	.534
Syncope	4	41.75	56.91	2	15.50	6.36	.573
Other	12	37.75	32.60	53	18.17	18.08	.830
Descriptor							
Aching	3	44.33	22.28	11	44.36	31.13	.999
Burning	2	42.00	18.39	7	62.14	33.21	.452
Crushing	3	96.33	88.93	16	51.31	37.83	.474
Dull				10	40.90	24.65	
Heavy	8	29.88	26.36	18	31.44	20.66	.871
Pressure	2	16.00	21.21	13	37.62	29.97	.351
Sharp	2	53.00	62.23	27	52.89	32.65	.996
Squeezing	4	39.50	15.59	8	57.38	58.68	.571
Tight	4	35.00	44.74	17	45.35	28.14	.559
Other	2	15.50	20.51	7	43.71	30.46	.268
Radiation							
Back	4	14.75	23.60	16	58.50	29.23	**.013**
Jaw	4	43.50	17.99	13	32.92	21.45	.388
Left arm	15	43.00	32.30	66	41.83	25.49	.880
Left shoulder	2	28.50	37.48	14	41.29	35.24	.640
Neck	3	20.67	29.84	17	38.88	27.81	.313
Right arm	7	37.43	30.82	14	42.14	25.15	.711
Throat	1	31.00		5	49.00	46.68	.743

Table 70
Door to Doctor by Age (Men)

Variable	N	> 65 yrs. Mean	SD	N	≤ 65 yrs. Mean	SD	p
Marital status							
Married	100	43.29	31.72	106	46.53	37.24	.504
Single	5	78.40	31.65	30	56.40	38.56	.237
Widowed	18	43.33	28.95				
Divorced	1	35.00		4	35.25	41.23	.996
Day of week							
Weekday	53	39.74	25.04	50	47.40	31.05	.928
Weekend	77	47.52	34.67	105	47.00	40.38	.170
Onset time							
0001-0600	25	36.20	25.31	14	29.64	14.20	.307
0601-1200	35	38.23	25.43	41	49.54	39.44	.149
1201-1800	24	48.67	40.52	19	48.95	31.26	.980
1801-2400	16	46.81	28.94	31	45.06	43.38	.885
Risk Factors							
Smoking	16	47.69	29.77	49	43.24	38.95	.678
Diabetes	38	39.63	27.37	26	49.85	32.54	.180
Dyslipidemia	58	44.45	36.82	57	44.09	37.21	.958
Family History	33	56.21	38.24	48	46.44	35.19	.239
Hypertension	68	41.57	26.89	53	51.79	39.05	.091
Medical History							
Angina	44	42.61	29.90	22	35.73	31.64	.390
MI	64	39.08	26.74	27	41.11	28.06	.745
PTCA	32	38.16	28.11	15	34.80	23.24	.690
CABG	32	35.53	22.16	16	45.69	37.87	.333
CHF	18	42.44	32.22	3	91.00	46.81	**.034**
CVA	18	28.22	15.14	5	49.40	29.77	**.037**
Renal Insufficiency	17	32.18	28.91	2	24.50	19.09	.722
Renal failure	6	40.83	18.89	2	37.50	10.61	.826
TIA	8	31.38	15.05	1	30.00		.934
Arrhythmia	20	47.70	37.07	12	40.33	25.13	.548
Chief Complaint							
Chest pain							
Non specific	40	39.55	28.87	30	47.47	35.67	.308
Retrosternal	27	45.56	26.73	30	49.40	31.55	.624
Left sided	24	45.00	24.85	43	34.33	24.61	.095
Right sided	3	54.67	43.62	4	56.00	45.00	.970
Midsternal	19	58.16	49.36	14	49.43	54.69	.635
Epigastric pain	6	34.50	21.73	12	61.08	41.94	.096
Dyspnea	7	37.71	23.11	8	36.50	28.32	.930
Left arm/shoulder pain	2	40.00	18.39	3	63.00	53.73	.616
Other	3	59.33	59.21	2	130.50	115.26	.198

Table 70 (Continued)
Door to Doctor by Age (Men)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Associated symptoms							
Diaphoresis	47	36.53	22.53	44	42.48	41.03	.390
Dyspnea	51	46.98	35.36	58	47.53	44.24	.943
Dizziness	6	39.33	19.74	13	43.38	30.82	.773
Nausea	30	42.57	40.57	33	42.00	28.36	.949
Vomiting	7	25.00	17.06	3	30.67	10.02	.613
Weakness	1	23.00		9	42.11	38.52	.650
Fatigue	2	29.00		2	70.50	30.41	.193
Syncope	4	15.50	12.92	2	68.00	80.61	.525
Other	26	30.88	19.07	37	45.92	41.72	.060
Descriptor							
Aching	5	29.60	19.19	9	52.56	30.65	.158
Burning	4	45.50	20.57	5	67.40	36.23	.320
Crushing	10	55.90	57.67	9	61.22	39.27	.819
Dull	5	40.60	20.74	5	41.20	30.60	.972
Heavy	12	34.42	22.35	14	28.00	22.14	.470
Pressure	8	29.50	20.11	8	39.63	35.46	.494
Sharp	13	51.69	30.33	17	52.47	36.27	.951
Squeezing	8	44.38	21.74	4	65.50	84.03	.653
Tight	8	52.13	38.73	14	40.93	26.45	.429
Other	1	105.00		8	29.00	17.29	.004
Radiation							
Back	10	61.90	32.55	10	37.60	30.05	.100
Jaw	11	38.82	19.27	6	23.17	23.54	.375
Left arm	40	40.17	23.67	42	43.55	29.19	.568
Left shoulder	3	34.00	24.56	13	41.00	37.09	.763
Neck	10	38.20	22.45	10	34.10	33.96	.754
Right arm	11	36.73	20.74	10	44.80	32.29	.500
Throat	2	25.50	7.78	4	56.25	50.55	.464

Table 71
Door to Doctor by Final Diagnosis (Women)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Marital status							
Married	8	42.25	29.26	99	57.33	53.11	.431
Single	3	35.00	13.75	21	93.81	85.31	.255
Widowed	12	53.75	40.71	40	55.63	48.76	.904
Divorced				18	47.11	24.64	
Day of week							
Weekday	6	43.50	24.06	45	53.38	38.56	.383
Weekend	17	48.65	37.71	143	61.45	58.75	.546
Onset time							
0001-0600	7	36.29	23.66	26	45.19	32.62	.506
0601-1200	7	56.43	46.50	44	53.16	40.26	.846
1201-1800	1	1.00		31	62.71	69.34	.388
1801-2400	4	33.75	16.26	30	71.03	61.57	.243
Risk Factors							
Smoking	1	44.00		19	51.68	28.88	.798
Diabetes	4	43.25	49.76	22	58.77	54.20	.599
Dyslipidemia	8	48.50	33.39	59	51.19	55.56	.895
Family History	7	65.43	38.06	52	60.58	49.46	.804
Hypertension	19	49.11	35.39	64	64.20	62.52	.319
Medical History							
Angina	3	47.67	26.73	43	53.56	35.38	.780
MI	6	58.67	41.74	34	45.00	27.29	.304
PTCA	1	115.00		16	35.44	21.64	**.003**
CABG	2	74.50	57.28	15	39.33	20.77	.544
CHF	1	60.00		11	47.18	41.54	.774
CVA	6	58.00	43.55	8	53.88	22.33	.820
Renal Insufficiency	4	89.00	22.55	8	43.50	33.62	**.036**
Renal failure	2	41.50	57.28	1	27.00		
TIA				1	34.00		
Arrhythmia	3	94.67	33.50	19	69.53	49.42	.870
Chief Complaint							
Chest pain							
Non specific	6	36.67	25.66	69	59.90	41.76	.186
Retrosternal	3	73.00	41.58	35	76.06	78.91	.948
Left sided	3	59.33	48.21	28	60.18	68.10	.944
Right sided				6	30.33	17.37	
Midsternal	2	46.00	28.28	23	50.43	35.71	.867
Epigastric pain	1	56.00		9	41.56	10.63	.233
Dyspnea	2	12.00	15.56	5	43.00	29.22	.229
Other	5	30.40	8.85	2	75.00	41.01	.363

Table 71
Door to Doctor by Final Diagnosis (Women)

Variable	MI N	MI Mean	MI SD	Non-MI N	Non-MI Mean	Non-MI SD	p
Associated symptoms							
Diaphoresis	6	61.00	35.51	54	46.56	39.61	.396
Dyspnea	10	55.60	38.38	81	55.67	38.68	.996
Dizziness	2	74.50	57.28	25	54.64	31.04	.413
Nausea	11	49.91	36.88	36	51.08	41.97	.934
Vomiting	2	43.50	17.68	4	46.25	28.86	.894
Weakness	3	54.67	43.98	9	35.78	24.01	.354
Fatigue	2	73.50	41.72	4	100.00	119.42	.786
Syncope	1	36.00		2	52.50	28.99	.723
Other	8	43.13	44.87	68	63.94	48.70	.253
Descriptor							
Aching	1	82.00		4	126.50	160.93	.820
Burning	1	1.00		8	49.63	32.77	.205
Crushing				18	71.83	88.30	
Dull	1	50.00		6	50.17	52.35	.998
Heavy	2	65.00	67.88	30	67.13	44.38	.949
Pressure				18	66.00	63.31	
Sharp	2	95.50	27.58	11	80.36	60.30	.741
Squeezing	3	56.67	23.44	11	57.00	27.53	.985
Tight	3	39.67	14.15	13	43.77	15.24	.678
Other				7	52.29	49.60	
Radiation							
Back	3	50.33	23.16	23	68.17	79.19	.706
Jaw	1	44.00		13	58.46	27.27	.619
Left arm	7	45.86	21.20	46	54.33	33.17	.386
Left shoulder	2	47.00	4.24	13	58.46	31.01	.231
Neck	3	50.67	22.75	29	48.38	32.16	.906
Right arm	2	49.00	24.04	21	47.76	29.55	.955
Throat				5	43.80	29.98	

Table 72
Door to Doctor by Age (Women)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Marital status							
Married	44	52.91	60.96	64	58.91	44.39	.555
Single	4	80.25	61.11	20	87.70	86.95	.873
Widowed	51	56.02	46.22	3	49.67	52.55	.819
Divorced	8	52.00	25.68	10	43.20	24.41	.468
Day of week							
Weekday	26	51.38	38.32	26	52.73	35.87	.406
Weekend	84	56.86	54.73	78	64.80	58.80	.896
Onset time							
0001-0600	15	34.00	27.22	20	52.75	31.89	.076
0601-1200	27	52.22	33.19	24	55.17	48.44	.799
1201-1800	17	46.12	42.12	15	77.40	89.35	.206
1801-2400	21	68.76	60.60	14	64.71	57.07	.844
Risk Factors							
Smoking	2	38.00	8.49	19	54.42	29.37	.450
Diabetes	19	52.42	39.44	7	67.14	82.48	.540
Dyslipidemia	46	51.59	60.01	22	49.05	34.37	.854
Family History	28	53.14	35.79	31	68.39	56.45	.226
Hypertension	60	57.28	58.61	24	68.71	54.17	.412
Medical History							
Angina	36	52.94	35.10	10	54.00	34.93	.933
MI	25	51.48	33.09	15	39.67	21.79	.227
PTCA	13	39.69	29.74	4	41.50	28.05	.916
CABG	13	47.69	28.48	4	29.75	16.17	.254
CHF	11	47.82	41.69	1	53.00		.908
CVA	12	53.50	32.76	2	68.50	28.99	.556
Renal Insufficiency	12	58.67	36.88				
Renal failure	2	14.00	18.39	1	82.00		.204
TIA	1	34.00					
Arrhythmia	18	73.11	46.20	5	66.60	55.21	.791
Chief Complaint							
Chest pain							
Non specific	38	55.13	35.40	38	61.63	46.02	.492
Retrosternal	22	87.09	89.16	17	59.35	51.15	.260
Left sided	16	47.69	34.62	15	73.33	87.34	.286
Right sided	4	31.50	16.03	2	28.00	26.87	.845
Midsternal	8	46.88	28.54	17	51.59	37.97	.759
Epigastric pain	4	43.25	10.34	6	42.83	12.42	.957
Dyspnea	4	19.50	24.62	3	53.67	24.58	.129
Other				7	43.14	28.39	

Table 72 (Continued)
Door to Doctor by Age (Women)

Variable	> 65 yrs. N	Mean	SD	≤ 65 yrs. N	Mean	SD	p
Associated symptoms							
Diaphoresis	31	46.68	32.81	30	50.83	45.46	.363
Dyspnea	44	49.93	31.41	49	61.14	42.95	.683
Dizziness	14	57.71	31.18	13	54.38	34.67	.152
Nausea	30	45.90	28.46	17	59.47	55.78	.795
Vomiting	7	52.00	27.95				
Weakness	11	42.82	29.28	1	15.00		.384
Fatigue	6	91.17	95.35				
Syncope	2	34.00	2.83	1	73.00		.056
Other	36	52.56	35.39	40	70.03	56.95	.109
Descriptor							
Aching	2	17.00	11.31	4	159.50	131.92	.224
Burning	4	29.25	41.02	5	56.20	27.18	.274
Crushing	12	84.67	105.13	6	46.17	31.71	.399
Dull	1	29.00		6	53.67	51.34	.675
Heavy	15	70.27	47.37	17	64.12	43.32	.704
Pressure	9	48.67	25.45	11	80.55	76.87	.251
Sharp	5	69.60	29.76	8	90.88	68.22	.457
Squeezing	7	65.43	29.99	7	48.43	26.51	.232
Tight	9	47.11	13.51	7	37.71	15.38	.215
Other	2	43.50	23.34	5	55.80	59.16	.796
Radiation							
Back	13	78.38	99.60	13	53.85	37.56	.414
Jaw	8	53.25	32.77	6	63.00	15.96	.517
Left arm	26	48.35	27.93	27	57.89	35.05	.279
Left shoulder	5	66.60	36.37	10	52.10	25.37	.381
Neck	12	42.67	23.74	20	52.15	34.90	.413
Right arm	17	45.06	24.74	6	55.83	39.35	.441
Throat				5	43.80	29.98	.156

Door to Drug

Door to drug time refers to time elapsed between arrival of the patient in the ED, to time of thrombolytic administration, or in the case of Primary PTCA, the time that the wire crosses the lesion. Data for select variables and their association with door to drug time are displayed in Tables 73 and 74.

There were no significant differences in door to drug times between patients older than 65 years and those 65 years of age and younger in any of the variables studied. When men and women were compared on the same variables, women presenting on the

weekend had a significantly shorted door to drug time than did men (t = 5.043, p. = .015). Although the data is not included in the tables, there were no significant differences in door to drug time related to time of onset of symptoms on the basis of age or gender.

Table 73
Door to Drug by Gender (STEMI)

		Men			Women		
Variable	N	Mean	SD	N	Mean	SD	p
Age							
> 65 years	6	117.50	67.06	3	205.00	222.80	.569
< 65 years	6	86.50	54.03	3	208.00	201.47	.406
Day of week							
Weekday	10	79.90	33.02	3	342.00	184.82	.132
Weekend	2	212.50	28.99	3	71.00	31.58	**.015**
Cardiac Risk Factors							
Smoker	5	91.20	59.01				
Diabetes	2	97.00	38.18	2	294.50	234.05	.360
Family History	3	109.67	75.40	1	437.00		.064
Dyslipidemia	5	114.20	74.10	3	181.00	221.76	.658
Hypertension	6	106.33	69.68	4	168.25	196.20	.489
Medical History							
Angina	2	53.50	13.44				
MI	2	151.50	115.26	1	58.00		.628
PTCA	1	233.00					
CABG				1	129.00		
CVA	2	87.00	69.30	1	48.00		.726
Renal Insufficiency	3	81.33	49.97				
ECG Findings							
ST elevation							
Anterior	7	98.29	68.59	2	82.50	34.65	.182
Inferior	3	115.67	67.90	3	212.33	218.28	.505
LBBB	1	124.00					

Table 74
Door to drug by Age (STEMI)

Variable	N	> 65 yrs. Mean	SD	N	≤ 65 yrs. Mean	SD	p
Gender							
Men	6	117.50	67.06	6	86.50	54.03	.399
Women	3	205.00	222.80	3	208.00	201.47	.987
Day of week							
Weekday	6	155.33	153.53	7	127.57	139.23	.739
Weekend	3	129.33	94.50	2	125.00	94.75	.963
Cardiac Risk Factors							
Smoking	0			5	91.20	59.01	
Diabetes	3	218.00	211.31	1	129.00		.750
Family History				4	191.50	174.86	
Dyslipidemia	3	139.00	92.54	5	139.40	167.32	.997
Hypertension	6	175.67	153.55	4	64.25	20.66	.195
Medical History							
Angina				2	53.50	13.44	
MI	2	151.50	115.26	1	58.00		.628
PTCA	1	233.00					
CABG				1	129.00		
CVA	3	74.00	53.93				
Renal Insufficiency	3	81.33	49.97				
CABG Waiting list	1	38.00					
ECG Findings							
Anterior	6	114.67	67.09	3	55.00	9.85	.182
Inferior	2	254.00	291.33	4	119.00	55.84	.630
LBBB	1	124.00					

Mode of Arrival

Information on arrival mode was available from 94% (n = 491) of the Emergency Records. Patients arriving by EMS accounted for 33.7% (n = 176) of the sample, while 60.3% (n = 315) came by private vehicle or on foot. Similar numbers of men and women came to hospital via EMS in the total sample, MI and non-MI subgroups. Within the MI subgroup, there were no differences in transportation mode between the older and younger age groups. Patients over the age of 65 years in the total sample (χ^2 = 41.997, p = <.001), non-MI subgroup (χ^2 = 34.857, p < .001), "men only" (χ^2 = 17.404, p <.001) and "women only" subgroups (χ^2 = 25.905, p <.001) were more likely to come to

hospital by EMS than their younger counterparts. Similarly, a final diagnosis of MI in the total sample (χ^2 =24.036, p < .001), "men only" (χ^2 = 13.430, p < .001) and "women only" subgroups was associated with EMS transportation to hospital.

Evaluation and Management

Upon arrival in the Emergency Department patients complaining of chest pain undergo a series of evaluations that include vital signs, continuous ECG monitoring, 12-lead electrocardiogram, laboratory tests and other radiological or diagnostic examinations deemed appropriate by the physician.

Vital Signs

Admission blood pressure and heart rate were available on 99% (n = 518) of patients entering the Emergency Department. Systolic blood pressure ranged from 60-210 mm Hg, with a mean pressure of 137.95 (SD = 24.13), and a median of 137.00. Diastolic pressure ranged from 31-141 mm Hg, with a mean of 77.96 mm Hg (SD = 15.30), and a median of 79 mm Hg. Heart rate on arrival ranged from 42-186 beats per minute (bpm), with a mean of 76 bpm (SD = 17.37), and a median of 74 bpm.

Table 75
Vital Signs on Admission to the Emergency Department

	Mean	SD	Median	Mode
Total Sample				
SBP	137.95	24.13	137.00	140
DBP	77.96	15.30	79.00	80
Heart rate	76.12	18.29	74.00	80
Non-MI Subgroup				
SBP	138.27	23.53	137.00	140
DBP	77.70	15.02	79.00	80
Heart rate	75.33	17.37	74.00	80
MI Subgroup				
SBP	136.05	28.16	137.50	150
DBP	79.47	16.81	78.50	80
Heart rate	81.00	22.76	77.00	60

Laboratory Tests

Blood for laboratory investigations was drawn from patients soon after their arrival in the Emergency Department, with mainly normal findings. Within the MI subgroup hemoglobin, white blood count and sodium levels were ordered on 100% (n = 76) of the patients. CK and potassium levels were ordered on 99% (n = 75) of patients, platelet counts on 97% (n = 74), Troponin I on 93% (n = 71), creatinine on 92% (n = 70), glucose on 91%(n = 69), urea on 83% (n =63), PTT on 79% (n = 60), INR on 78% (n = 59), CKMB on 74% (n = 56), magnesium on 46% (n = 35), calcium on 41% (n = 31) and d-dimer on 3% (n = 2). The most commonly ordered test in the non-MI subgroup was CK, drawn on 89% (n = 391) of patients. Hemoglobin, platelet count and white blood cell count were drawn on 87% (n = 380) of patients, sodium on 86% (n = 374), potassium on 84% (n = 369), glucose on 76% (n = 330), urea on 75% (n =329), Troponin I on 73% (n = 320), creatinine on 69% (n = 301), INR on 63% (n = 273), PTT on 61% (n = 268), CKMB on 38% (n = 164), calcium on 29% (n = 126), magnesium on 25% (n = 111), and d-dimer on 12% (n = 52) of patients.

Initial and peak cardiac marker values by gender (MI Subgroup) and type of MI are outlined in Tables 76 and 77. Men and women had similar initial levels of all cardiac markers, but men had greater peak CK levels (t = 2.405, p = .020) and greater peak CK-MB levels (t = 2.417, p = .020) than women. Similarly, when comparisons were made on the basis of type of MI, patients with STEMI had higher peak CK (t = 2.510, p = .020) and peak CK-MB levels (t = 2.110, p = .045) than their NSTEMI counterparts.

Table 76

Initial and Peak Cardiac Markers by Gender (MI Subgroup)

	Men			Women			
Lab Test	N	Mean	SD	N	Mean	SD	p
CK							
Initial	50	281.28	398.78	25	252.56	258.04	.745
Peak	43	1348.79	2025.38	23	546.04	607.51	.020
CK-MB							
Initial	36	24.47	53.66	20	33.63	42.07	.513
Peak	41	120.68	194.69	20	43.70	42.38	.020
Troponin I							
Initial	49	2.66	5.26	22	5.74	9.80	.090
Peak	41	17.08	26.66	22	11.81	17.56	.470

Table 77

Initial and Peak Cardiac Markers by Type of MI

	STEMI			NSTEMI			
Lab Test	N	Mean	SD	N	Mean	SD	p
CK							
Initial	22	364.00	531.81	49	196.76	180.02	.164
Peak	23	1942.91	2619.92	39	555.64	522.56	.020
CK-MB							
Initial	17	40.53	80.76	35	19.04	22.81	.297
Peak	22	162.05	236.44	35	51.29	86.20	.045
Troponin I							
Initial	21	3.04	5.62	46	3.08	4.93	.974
Peak	22	19.46	33.58	37	11.87	15.64	.327

Diagnostic Tests

Information on diagnostic evaluations is compiled in Table 75. A chest X-Ray was performed on 93 % (n =71) of patients in the MI subgroup. Of these, 49% (n = 35) were normal, and 45% (n = 32) demonstrated pulmonary edema, pleural effusion, or other abnormality. An additional 6% (n = 4) had a chest X-Ray marked as completed on the ED chart, but no results were available either electronically or on the chart. Of the 85% (n = 372) of the non-MI subgroup who had a chest X-Ray, 80% (n = 296) were normal,

while 20% (n = 76) demonstrated abnormalities such as nodules or opacities requiring further evaluation, cardiomegaly, pleural effusion, pulmonary edema, COPD, atelectasis, pneumomediastinum, and possible pulmonary embolus .

An exercise stress test was performed on 30 patients (7%) from the non-MI subgroup. Seventeen (56.6%) were negative, five (16.7%) were positive, and eight (26.7%) were non-diagnostic. Computerized tomography (CT) of the head was performed on 5.2% (n = 4) patients in the MI subgroup, with results split equally between normal and abnormal. By contrast, of the six patients (1.4%) from the non-MI subgroup undergoing the same exam, five (83%) were normal and one (13%) was abnormal. One patient from the MI subgroup underwent a CT of the abdomen, with normal results.

Table 78: Diagnostic Tests by Subgroup

	Chest X-Ray		Exercise Stress Test		CT Head		CT Abdomen	
	N	(%)	N	(%)	N	(%)	N	(%)
MI Subgroup	71	(93)			4	(5.2)	1	(1.3)
Normal	35	(49)			2	(50)	1	(100)
Abnormal	32	(45)			2	(50)		
No Results	4	(6)						
Non MI subgroup	372	(85)	30	(6.8)	6	(1.4)		
Normal	296	(80)	17	(56.6)	5	(83.3)		
Abnormal	76	(20)	5	(16.7)	1	(16.7)		
Non-diagnostic			8	(26.7)				

Electrocardiogram (ECG)

Rhythm. ECG results were available from 94% (n = 488) of the patients in the sample and are summarized in Table 54. The most common rhythm in both the MI and non-MI subgroups was sinus rhythm, which accounted for 82.6% (n = 57) of the MI subgroup, and 85.3% (n = 345) of the non-MI subgroup. Sinus bradycardia was present in 6.6%

(n = 5) of the MI subgroup and in 7.4% (n = 30) of the non-MI subgroup, while sinus tachycardia accounted for 4.4% (n = 3) of the MI group and 3.0% (n = 12) of the non-MI subgroup. Paced rhythm was exhibited by one patient (1.4%) in the MI subgroup and by 11 (2.7%) patients in the non-MI group. Two patients (2.9%) from the MI subgroup were found to be in atrial fibrillation, compared with five (1.2%) in the non-MI subgroup. Solitary patients accounted for SVT in the MI subgroup and atrial flutter in the non-MI subgroup.

Within the MI subgroup 20 (87%) patients with STEMI were found to be in sinus rhythm on the initial ECG, with a further 8.7% (n = 2) in sinus tachycardia, and 4.4% (n = 1) in sinus bradycardia. The non-ST segment elevation MI (NSTEMI) group demonstrated greater diversity with 80.4% (n = 37) in sinus rhythm, 8.2% (n = 4) in sinus bradycardia, 4.1% (n = 2) in atrial fibrillation, and 2.0% (n =1) of patients in each in sinus tachycardia, supraventricular tachycardia (SVT), and paced rhythm.

ST Segment Changes. Of the 23 patients categorized as STEMI, the most common ECG finding was ST elevation in the anterior leads (n = 7, 30.4%), followed by antero-lateral ST elevation (n = 5, 21.7%), inferior lead ST elevation (n = 5, 21.7%), infero-posterior ST elevation (n = 2, 8.7%), infero-lateral ST elevation (n = 1, 4.3%), and one left bundle branch block (4.3%). Of the two remaining cases, one patient demonstrated hyper-acute T-waves in the anterior leads and was taken to the Cardiac Catheterization Laboratory for urgent revascularization, while the other had a series of confusing ECGs due to staff error, but did demonstrate ST elevation in the lateral leads and non-specific ST-T wave changes.

In the NSTEMI group (n = 49), the most common finding on the initial ECG was non-specific ST segment /T wave changes (n = 23, 46.9%). This was followed by lateral ST segment depression (n = 7, 14.3%), antero-lateral ST segment depression (n = 5, 10.2%), inferior ST segment depression (n = 2, 4.1%), infero-lateral ST segment depression (n = 2, 4.1%) and eight (17.4%) categorized as "other". These included six diagnoses of "old MI" or "MI –age unknown" in the presence of elevated cardiac markers, one RBBB, and one patient in SVT, in whom changes were not apparent on the initial ECG. Three of the previously mentioned patients who had ST segment depression also had RBBB as a secondary finding. Three additional patients did not have ECGs on the chart at the time of data collection, possibly due to being included in their transfer package to another facility.

The majority of the non-MI subgroup had normal ECGs although the most common abnormal ECG finding in the non-MI subgroup was non-specific ST/T wave changes, present in 16.7% (n = 73) of the group, followed by ST segment depression in 3.3% (n = 15). One patient (0.2%) had diffuse ST segment elevation subsequently diagnosed as pericarditis, and another two had ST elevation in isolated leads, but no elevation of cardiac markers. Nineteen patients (4.5%) exhibited a right bundle branch block (RBBB) on initial ECG, while an additional 5.0% (n = 21) demonstrated left bundle branch block (LBBB). An additional 44 patients had evidence of a previous MI, described either as "old" or of indeterminate age.

Table 79

ECG Findings by Final Diagnosis

	STEMI N=23 (%)	NSTEMI N=46 (%)	Non-MI N=419 (%)
Rhythm			
Sinus rhythm	20 (86.9)	37 (80.4)	345 (85.3)
Sinus bradycardia	1 (4.4)	4 (8.7)	30 (7.4)
Sinus tachycardia	2 (8.7)	1 (2.2)	12 (3.0)
Atrial fibrillation		2 (4.4)	5 (1.2)
Atrial flutter			1 (0.3)
Paced		1 (2.2)	11 (2.7)
SVT		1 (2.2)	
ECG Changes			
Nonspecific ST–T wave changes	2 (8.7)	23 (46.9)	73 (16.7)
LBBB	1 (4.3)		21 (5.0)
RBBB		1 (2.0)	19 (4.4)
Other		5 (10.2)	44 (10.5)
ST Elevation			
Anterior	7 (30.4)		
Antero-lateral	5 (21.7)	1 (2.2)	
Inferior	5 (21.7)	2 (4.3)	
Infero-posterior	2 (8.7)		
Infero-lateral	1 (4.3)		
Lateral			1 (0.2)
Diffuse		1 (2.2)	1 (0.2)
AVR only			1 (0.2)
ST Depression			
Anterior			3 (0.7)
Antero-lateral		5 (10.2)	4 (0.9)
Inferior		2 (4.1)	
Infero-lateral		2 (4.1)	2 (0.5)
Lateral		7 (14.3)	6 (1.4)

Medications Administered in the Emergency Department

Records of medications administered in the ED and by EMS were available on 509 (97.5%) of patients.

ASA. ASA was recorded as administered in ED to 46.7% (n = 238) of patients in the sample; 83.3% (n = 60) of the MI subgroup and 40.7% (178) of the non-MI subgroup. Of the 180 patients who came to the ED via EMS, 53 (29.0%) were given ASA by EMS personnel. Both the MI and non-MI subgroups had similar percentages of patients receive ASA from EMS; 30.6% (15/49) in the MI subgroup and 29.0% (38/131) of the non-MI subgroup. There was no difference in ASA administration in either ED or by EMS in the "men only" group on the basis of age or final diagnosis, however, in the "women only" group, patients with a final diagnosis of MI were more likely to receive ASA in ED than were their non-MI counterparts (χ^2 =12.277, p.< .001). Within the MI subgroup, women (χ^2 = 4.221, p =.040) were more likely to receive ASA in ED than men, and patients 65 years of age or less were received ASA more frequently than did those over the age of 65 years (χ^2 =3.866, p =.049).

Nitroglycerine (SL). Sublingual (SL) nitroglycerine was administered to 46.2% (n = 241) of patients in the total sample; 33.5% (n = 176) in the ED, and by EMS personnel to 36.1% (n = 65) of eligible patients. Of the MI subgroup, 65.8% (n = 50) received SL nitroglycerine, with 42.1% (n = 32) receiving it in Emergency and 39.1% (n = 18) from EMS personnel. Within the non-MI subgroup, 43.2% (n = 189) received SL nitroglycerine; 32.5% (n = 142) in the ED and 35.3% (n = 47) of eligible patients received it from EMS personnel. There were no differences in SL nitroglycerine administration on the basis of age or gender in the MI subgroup, nor were there any

statistically significant differences in either of the gender exclusive groups on the basis of age or final diagnosis.

Nitroglycerine (Patch). A nitroglycerine patch was applied to 14.9% (n = 78) of the sample, with similar proportions of patients in both the MI (15.8%, n =12) and non-MI subgroups (14.9%, n = 65). Although no differences were found on the basis of final diagnosis, or gender, 18.4% (n = 46) of patients over 65 were prescribed a Nitro patch compared with 11.8% (n = 32) of those under 65 years of age ($\chi^2 = 4.513$, p = .034). This association was also noted in the "men only" subgroup, in which 21.2% (n = 29) of men over the age of 65 years were prescribed a nitro patch compared with 11.0% (n = 18) of those under 65 ($\chi^2 = 5.776$, p = .016). No other statistically significant differences based on age were noted either among women or in the sample as a whole.

Nitroglycerine (Intravenous). Intravenous (I.V.) nitroglycerine was used in 15.9% (n = 83) of patients; 36.8% (n = 28) of the MI group and 12.6% (n = 55) of the non-MI subgroup ($\chi^2 = 28.088$, p < .001). I.V. nitroglycerin was more likely to be administered to men in the total sample (19.7%, n = 59,) than to women (10.8%, n = 24) ($\chi^2 = 7.483$, p = .006), to those over 65 years (18.3%, n = 55) compared with those 65 years and under (12.6%, n = 28) ($\chi^2 = 13.349$, p = .001). and to patients with a final diagnosis of MI (n = 28, 36.8%) compared to those who did not have an MI (n = 55, 12.6%) ($\chi^2 = 28.088$, p = < .001). The latter finding was recurrent in both men ($\chi^2 = 12.361$, p < .001) and women ($\chi^2 = 27.868$, p <.001) when patients of the same gender were compared on the basis of final diagnosis. In the "men only" subgroup, patients over 65 years were more likely to received I.V. nitroglycerine than men 65 years of age or less (χ^2 =12.361, p < .001).

Beta blockers (I.V.) Intravenous beta-blockers were administered to 7.8% of the total sample; 26.3% (n = 20) of the MI subgroup and 4.6% (n = 20) of the non-MI subgroup. There were no significant differences on the basis of age or gender in the total sample, the MI subgroup, or within gender exclusive groups. Patients with a final diagnosis of MI in the total sample ($\chi^2 = 42.557$, $p < .001$), "men only" ($\chi^2 = 16.818$, $p <. 001$), and "women only" ($\chi^2 = 22.843$, $p < .001$), groups were more likely to receive I.V. beta-blockers than patients with other diagnosis.

Heparin (I.V.). Intravenous heparin was administered to 171 patients (32.8%); 61 patients (80.3%) in the MI subgroup and 110 (25.2%) in the non-MI subgroup ($\chi^2 = 88.422$, $p <. 001$). Men in the total sample ($\chi^2 = 23.546$, $p <. 001$) were more likely to receive IV heparin than their female counterparts, while patients older than 65 years in the total sample ($\chi^2 = 21.962$, $p <. 001$), "men only" ($\chi^2 = 18.702$, $p < .001$) and "women only" ($\chi^2 = 7.045$, $p = .008$) subgroups were more likely to receive heparin than their younger counterparts. Heparin administration within the MI subgroup was relatively consistent, and as a result there were no statistically significant differences on the basis of age or gender.

Analgesics. Analgesics were administered to 121 patients in the ED: 36.8% (n = 28) of the MI subgroup and 21.3% (n = 93) of the non-MI subgroup. Patients with a final diagnosis of MI ($\chi^2 = 8.698$, $p = .003$) and men specifically ($\chi^2 = 10.576$, $p = .001$), were more likely to receive an analgesic than their non-MI counterparts. Analgesics administered by EMS personnel did not demonstrate any differences on the basis of age, gender, or final diagnosis.

Reperfusion Strategies. A variety of reperfusion strategies were utilized on the 23 patients presenting with STEMI. The most common thrombolytic was t-Pa, used for 34.8% (n = 8) of the cases. r-Pa was administered to 13.0% (n = 3) of patients as part of a randomized clinical trial, and streptokinase was used on an additional 8.7% (n = 2) of patients. Five patients (21.7%) were taken to the Cardiac Catheterization Laboratory from the ED, where four had primary PTCA and one did not have reperfusion attempted. Of the remaining five patients (21.7%), one suffered trauma secondary to his MI and subsequent collapse, thus acquiring contraindications to thrombolysis, two patients did not meet criteria for thrombolytic administration, one patient did not have an ECG until he was admitted to the hospital and the MI was discovered at that time, and finally, data is incomplete on one patient.

Consultations

Data on consultations was available from all patients in the sample. Cardiology consults were conducted on 53.5% of patients (n = 283), of which five were in conjunction with other services (Medicine [2], Intensive Care [1], Endocrine [1], and Cardiovascular surgery [1]). Independent consults were carried out by Medicine (4), Intensive Care (2), Gastroenterology (2), and Neurology (1). Overall, men in the sample (χ^2 = 15.559, $p < .001$), as well patients older than 65 years in the total sample (χ^2 = 18.174, $p < .001$) "men only" (χ^2 = 21.647, $p < .001$) and "women only" (χ^2 = 7.482, $p = .006$) subgroups were more likely to be seen in consult than were their counterparts. Again, management patterns for the MI group are relatively consistent and as a result there are no statistically significant differences in consultations on the basis of age or gender.

Diagnoses, Disposition, and Outcomes

Diagnosis

A diagnosis was available for 97.7% (n = 513) of patients in the total sample. The most common diagnosis was chest pain – not yet diagnosed (NYD) (44.4%) followed by angina (17.2%), MI (14.8%), unstable angina (13.5%), non-cardiac complaint (8.8%), arrhythmia (0.8%), and congestive heart failure (CHF) (0.6%). The category of non-cardiac complaint included diagnoses of non-cardiac chest pain, abdominal pain NYD, costochondritis, gastritis, pancreatitis, CAD, and pneumonia.

Of those who were discharged from the ED (n = 328), the most common diagnosis was chest pain NYD (67.5%) followed by angina (17.6%), non-cardiac complaint (11.2%), unstable angina (1.5%), MI and arrhythmia (0.9% each), and CHF (0.3%). The most common diagnosis of patients admitted to hospital was MI (39.5%) followed by unstable angina (34.6%) angina (16.2%) non-cardiac complaint (4.3%), chest pain NYD (3.2%), CHF (1.1%) and arrhythmia (0.5%).

Patient Disposition

Of the 522 patients, 328 (62.8%) were discharged from the ED, 149 (28.5%) were admitted to the University of Alberta Hospital (UAH), 35 (6.7%) were admitted to other hospitals, eight (1.5%) discharged themselves against medical advice, and two (0.4%) died in the Emergency Department. Of those admitted to the UAH, 47.0% (n = 70) went to CCU, 41.6% (n = 62) went to a Cardiology ward, 6.7% (n = 10) went directly to the Cardiac Catheterization Lab, 3.4% (n = 5) went to a Medical unit, and 0.7% (n = 1) patient went to each of the Intensive Care Unit and Dayward.

Length of Stay

Data on length of stay was available for 82.1% patients (n = 151) admitted to hospital. The average length of stay was 11.54 ± 11.52 days, with a median of 8 days and a mode of 3 days. Men averaged 10.78 ± 8.60 days in hospital compared to 13.39 ± 16.61 days for women. Patients over the age of 65 years were in hospital an average of 13.38 ± 13.20 days, while those 65 years of age and younger, stayed an average of 8.41 ± 6.949 days (t = 3.026, p = .003). Patients with a MI were in hospital 12.89 ± 14.71 days on average, compared with their non-MI counterparts whose stay averaged 10.71 ± 9.056 days. Men over the age of 65 years were hospitalized 12.11 ± 9.11 days, while those 65 years and younger stayed 8.79 ± 7.421 days (t = 1.985, p = .050). Men who suffered a MI stayed 10.00 ± 7.02 days, while those without an MI stayed 11.17 ± 9.31 days on average. Women over the age of 65 years averaged 16.00 ± 19.00 days in the hospital, while women 65 years and younger averaged 7.15 ± 5.13 days in hospital. Women who experienced a MI were hospitalized for an average of 17.86 ± 21.87 days, while women without a MI stayed in hospital an average of 9.30 ± 8.25 days. Within the MI subgroup, men stayed an average of 10 ± 7.02 days, while women averaged 17.86 ± 21.86 days in hospital. Also within the MI subgroup, those over the age of 65 years stayed an average of 16.53 ± 17.73) days compared with 7.52 ± 5.30 days for patients 65 years of age or less (t = 2.784, p = .008). ST segment elevation MI (STEMI) patients stayed an average of 9.80 ± 7.44 days compared to patients with a non-ST segment elevation MI (NSTEMI) who spent an average of 14.49 ± 17.58 days in hospital.

Time in the Emergency Department

Data on time spent in the Emergency Department (minutes) was available on 94.8% (n = 495) of patients in the sample. The mean time spent in the Emergency Department was 8.5 ± 4.8 hours with a median of 7.7 hours, and ranged from 52 minutes to 30.2 hours. Patients admitted to hospital spent an average of 9.5 ± 5.10 hours (median 8.7) in the ED compared to 7.97 ± 4.6 hours (median 7.3) for those who were discharged. Patients over the age of 65 years remained in ED longer than their younger counterparts in the total sample (t = 3.722, p <. 001), the "men only" subgroup (t = 3.222, p < .001) and the non-MI subgroup (t = 2.784, p = .001). Within the MI subgroup, NSTEMI patients (n = 45) remained in the ED an average of 9.9 ± 3.8 hours compared to 8.3 ± 4.5 hours for those in the STEMI group (t = 7.837, p. < .001). There were no statistically differences in ED time on the basis of gender

30 day Outcomes

Return to the Emergency Department. No statistically significant differences were noted between the proportion of men and women (8.5% vs. 4.5%) who returned to ED in the total sample or in the non-MI subgroup (9.6% vs. 4.7%). In the MI subgroup, 4.0% of both men and women returned to the ED within 30 days of their initial visit. Of the 35 patients that returned to the ED, 13 were re-admitted with a variety of diagnoses including unstable angina (6), MI (3), Chest pain NYD (2), non-cardiac complaint (1) and angina (1). Six patients underwent PTCA during their admission. Patients over the age of 65 years returned to the ED more frequently than their younger counterparts (9.3% vs. 4.5%) in the total sample (χ^2 = 4.736, p = .030), the non-MI subgroup (11.2% vs. 4.2%) (χ^2 = 7.692, p. = .006), and in the "men only" subgroup (12.6% vs. 5.0%) (χ^2 = 5.519,

p = .019). When women older than 65 years were compared to those 65 years and younger, a greater number of older women returned to the ED (5.3% vs. 3.7%), but this was not statistically significant. When age related comparisons were made in the MI subgroup, it was found that those over the age of 65 years (2.1%) returned to the ED less frequently than patients 65 yeas of age or younger (7.4%), but this difference was not statistically significant. Both men (4.0% vs. 9.6%) and women (4.0% vs. 4.7%) who received a final diagnosis of MI returned to the ED less frequently than patients with a diagnosis other than MI, however these results were not statistically significant.

(Re)admission. Men (5.7%) in the sample were more likely to be re-admitted than women (1.4%) ($\chi^2 = 6.545$, p = .011), as were men in the non-MI subgroup (6.3% vs. 1.0%) ($\chi^2 = 7.709$, p. = .005). Equal numbers of men and women (4.0%) in the MI subgroup were readmitted to hospital within 30 days of their initial visit to the ED.

Patients over 65 years of age were more likely to be admitted after the index visit than those 65 years or younger in the total sample ($\chi^2 = 4.046$, p = .044) and "men only" subgroup ($\chi^2 = 6.925$, p = .008). A similar pattern was noted in the MI and non-MI subgroups, but those results were not statistically significant. In contrast, younger women (1.9%) and women with a final diagnosis of MI (4.0%) were more likely to be admitted to hospital within 30 days in their initial visit, than were older women (0.9%) and women whose final diagnosis was not MI (1.0%). Men who had a final diagnosis of MI were less likely to be re-admitted than men who did not have an MI at their initial visit (4.0% vs. 6.3%).

PTCA. Men (11.0%) were more likely than women (3.2%) to have a PTCA within 30 days of their initial visit to the ED ($\chi^2 = 11.014$, p = .001). Similar results were found

in the non-MI subgroup, with more men (9.1%) than women (1.6%) undergoing PTCA (χ^2 = 11.191, p = .001). Men (21.6%) in the MI subgroup were also more likely to undergo PTCA than were women (16.0%), however, this finding was not statistically significant.

Patients over the age of 65 were more likely to undergo a PTCA than those 65 years or younger in the total sample (8.4% vs. 7.0%), in the non-MI subgroup (7.6% vs. 4.2%), as well as in the "men only" (12.4% vs. 9.8%) and "women only" (3.5% vs. 2.8%) subgroups, none of which were statistically significant. In the MI subgroup, patients 65 years and over (12.2%) were less likely to undergo a PTCA than their younger counterparts (33.3%) (χ^2 = 4.887, p = .027). Patients with a final diagnosis of MI (19.7%) were more likely to undergo PTCA than their non-MI counterparts (5.7%) in the total sample (χ^2 = 17.620, p < .001), as well as in the "men only" (χ^2 = 6.626, p = .010) and "women only" (χ^2 = 10.576, p. = .004) subgroups.

CABG. Men (5.3%) in the sample were more likely to undergo CABG within 30 days of their index visit than women (2.7%). This was also the case in the non-MI subgroup (4.5% vs. 1.6%). In the MI subgroup however, the reverse was true, with women (12.0%) undergoing CABG more frequently than men (9.8%). None of these findings were statistically significant. Patients over the age of 65 years underwent CABG more frequently than their younger counterparts in the total sample (5.2% vs. 3.3%), MI subgroup (14.3% vs. 3.7%), " men only" (5.8% vs. 4.9%) and "women only" (4.4% vs. 0.9%) subgroups. In the non-MI subgroup, patients 65 years of age and younger were marginally more likely to undergo CABG (3.3%) than their older counterparts (3.1%), however, none of these differences were statistically significant.

Appraisal of the incidence of CABG within 30 days of the initial visit, on the basis of final diagnosis yielded mixed results. In the total sample, patients with a final diagnosis of MI were more likely to undergo CABG than those who did not suffer a MI ($\chi^2 = 6.737$, p. <. 001). Men were also more likely to undergo CABG if they had a MI (9.8% vs. 4.5%), although this finding was not statistically significant. In contrast, women who suffered an MI were less likely to have CABG than their non-MI counterparts ($\chi^2 = 5.542$, p = .003).

Mortality. Data on 30-day mortality was available from 65.1% (n = 342) of patients. The overall mortality rate was 4.1% (3.6% for men and 4.8% for women). Rates were higher in the MI subgroup, in which women had a mortality rate of 20%, compared to 10.5% for men. Data available on the STEMI group (n =15), revealed an overall mortality rate of 20%. Door to drug time for this group averaged 3.96 hrs. ± 3.21 hrs. compared to 2.20 ± 1.85 hrs. for the survivors. There were no statistically significant differences in mortality between men and women, or patients over the age of 65 years, compared with those 65 years and younger in any of the groups. The differences in mortality between MI and non-MI patients were significant in the total sample ($\chi^2 = 15.669$, p < .001), as well as in the "men only" ($\chi^2 = 4.264$, p = .028) and the "women only" ($\chi^2 = 10.443$, p = .003) subgroups.

CHAPTER FIVE

Discussion of the Findings

The purpose of this study was to describe the characteristics, diagnostic evaluation, management strategies, and outcomes of adults with non-traumatic chest pain presenting to the Emergency Department at the University of Alberta Hospital. A descriptive, retrospective study of adults with non-traumatic chest pain presenting to an Emergency Department was conducted. Health records were reviewed to obtain data on demographic characteristics, risk factors, medical history, symptom characteristics, clinical presentation, diagnostic evaluation, management, time to treatment measures, disposition, and outcomes. Descriptive statistics including the median, mean, standard deviation, range, and percentages were calculated on specified variables. Chi-square and independent *t*-tests were conducted to describe differences among specific subgroups, namely gender, age (over 65 years vs. 65 years and younger), and final diagnosis of MI or non-MI.

Risk Factor Profile of the Sample

Of the 522 patients included in the sample, 57.5% were men and 42.5% women. When the MI subgroup was examined, the proportion of men increased to 67%, with a corresponding decrease in the number of women to 33%. Within the MI subgroup there were no patients less than 40 years of age, and although men outnumbered women in the younger age groups, women made up a greater proportion of the population aged 70 to 90 years. In the MI subgroup the mean age of the men was 68.24 years, with a median of 68 years, compared to a mean of 69.4 years, with a median of 70 years for women. The majority of patients (64.5%) in the sample were married, with significantly more married

men than women in the total sample, MI and non-MI subgroups. In these same categories, women were significantly more likely to be widowed than men.

Data collected on the smoking habits of the patients, revealed 23.4% to be current smokers. Furthermore, of the patients who gave a history of previous MI, 21% reported themselves as smokers. This compares with 24% of Canadians in the 1996-97 Population Health Survey who described themselves as daily smokers (Heart and Stroke Foundation, 1999). Although the number of smokers in this population seems high, the number of smokers may if fact be under represented, as 27.0% (n = 141) of the charts lacked an assessment of this particular cardiac risk factor. Lack of documentation of cardiac risk factors was problematic, not only for smoking but for the other risk factors as well. No comment on diabetes was made on 10.7% (n = 56) of the charts, although in most cases it could be gleaned from the medication history if present. Family history was absent on 33.1% (n = 173) of Emergency Records (this number does not include those patients who were unsure whether their family members had a history of heart disease), dyslipidemia on 31.6% (n = 165) and finally hypertension on 25.3% (n = 132). The risk factor profile for this cohort presenting to the Emergency Department with chest pain does not differ significantly from the literature (Roe, 2000)

Clinical Presentation of the Sample

Gender differences in symptom presentation of patients in this study were found to be similar to those described in the literature. Meischke et al. (1998), found women diagnosed with MI were more likely to complain of dyspnea, nausea, and vomiting, while men reported diaphoresis and chest pain more often. Reports of nausea were magnified in women with diabetes and those over 65 years of age. In addition to

diaphoresis in men, and dyspnea and nausea in women, Kudenchuk, Maynard, Martin, Wirkus and Weaver (1996) also identified abdominal pain and fatigue as being reported more often in women than men. Goldberg et al. (1998) added neck, back and jaw pain to this inventory, while Willich et al. (1993) contributed neck and shoulder pain as being more common in women than men. Women diagnosed with MI in this study, were more likely to report nausea than men ($\chi^2 = 4.064$, $p = .044$) and more likely to occur in women over 65 years ($\chi^2 = 4.959$, $p = .026$). With respect to diabetes, 80% of women complained of nausea compared to 40% of men; however, the small number of patients involved did not allow statistical significance to be attained. Men outnumbered women in the reporting of diaphoresis (54.3% vs. 31.6%), and chest pain (72.5% vs. 57.7%) but neither achieved statistical significance. The incidence of abdominal, neck, back, and shoulder pain, as well as fatigue, was greater in women than men, with jaw pain and vomiting more common in men. None of the latter findings achieved statistical significance, in part due to the small number of MI patients in the sample (n = 76; STEMI = 23 [30.3%]).

Although the size of the MI subgroup (14.6% of the sample) in this study, is in keeping with estimates that 10-15% of patients presenting to the Emergency Department with chest pain or chest pain complex will eventually be diagnosed with acute MI (Goldman et al., 1988; Rouan et al., 1987; Tierney et al., 1986), the small number affects the ability to draw meaningful conclusions. The number of patients presenting to the University of Alberta Hospital with a MI during the data collection period may be due in part to an ambulance diversion program, which is implemented when a site in the Capital Health Region lacks the resources to care for more patients. Between March and August

2000, the UAH was on total ambulance diversion 31.1% of the time (Capital Health, 2000). During this period of diversion, patients with chest pain or suspected MI would have been diverted to another hospital within the region, thus, potentially decreasing the number of patients available for the sample. Enrollment in acute ischemic syndrome clinical trials were curtailed significantly at the UAH during this time, while other sites in the region reported increases in the number of patients enrolled.

Recommended pharmacological therapy post MI often consists of ASA, beta-blocker, ACE Inhibitor, and lipid lowering therapy as indicated. Data collected in 1998 on approximately 3,000 patients discharged from Canadian hospitals post MI, revealed 82.7% were prescribed ASA, 46.4% ACE Inhibitors, 72.9% beta blockers, and only 19.7% were prescribed lipid lowering therapy (Heart & Stroke Foundation, 1999). Of the patients in this sample who gave a history of previous MI, 73.2% were taking ASA, 46.3% were using ACE Inhibitors, 66.7% were on beta-blockers and 50% were on lipid lowering therapy, however, only 58% of patients who gave a history of dyslipidemia, were currently taking lipid-lowering medication. When examining the disparity between the number of patients reported to be on lipid lowering therapy in 1998 compared with this study, it must be noted that lipid levels considered normal in 1998, would be regarded as elevated and requiring intervention in 2000. This may account for at least part of the incongruity in the number of patients on lipid lowering therapy. Although the other results are similar to the national picture, there is still a considerable gap between optimal care and practice.

Men and women were compared on numerous measures in an attempt to determine whether there are gender differences, not only in presentation, but in the management of

chest pain or chest pain complex. When medications on admission were examined, women in the sample were taking significantly more sleeping pills, anxiolytics, and anti-depressants than were men, and in the MI subgroup women were again significantly more likely to be using sleeping pills and anxiolytics. This raises questions regarding the number of treated anxiety disorders and depression among both men and women. Depression is three times more common in women than men, and depression can exacerbate anginal symptoms (Devon, & Zerwic, 2002). Do gender differences in the number of diagnosed and treated disorders account for the discrepancy, or do women suffer bias when it comes to heart disease? Although there are symptoms common to both ischemic heart disease and anxiety disorders (chest pain, shortness of breath, palpitations), women may be considered to be at less risk for heart disease, and are therefore diagnosed with anxiety disorder and prescribed medication, rather than undergoing diagnostic testing to reveal the cause of their symptoms.

Time to Treatment for the Sample

Time to treatment refers to the period of time between the onset of symptoms and the initiation of fibrinolysis. Presentation delay (the time before the patient presents to the ED) has been a rich source of research, as investigators attempt to pinpoint what factor or factors are responsible for an individual's decision to seek care. Much of the work has focused on the effect of demographics, symptom context, and socioeconomic variables, while more recent studies have begun to explore the emotions and psychological response of the patient to his/her symptoms. The GUSTO I study of over 41,000 patients reported a median presentation time of 85 minutes for U.S. sites and 105 minutes for sites outside the United States (Newby, 1996). Median presentation times for this study were 114.5

minutes for the STEMI patients, 160.5 minutes for the NSTEMI patients and 130.5 minutes for the non-MI subgroup . Presentation delay has been associated with female gender, advanced age, a history of angina, hypertension and diabetes. This study did not find any of these variables as having a significant effect on presentation time; however, of the variables that demonstrated a significant difference between age groups, patients 65 years and younger consistently presented earlier than their counterparts. In the both the MI subgroup and the total sample, women presented earlier than men. Consistent with the literature, this study found that diabetes and a history of angina were associated with presentation delay, but, in contrast to the literature, patients in this study with a history of hypertension tended to report to hospital more quickly than their normotensive associates. Smokers, patients with a presenting complaint of chest pain, diaphoresis, syncope and history of MI tended to present earlier in this study, as is suggested in the literature (Meischke et al., 1998), however, these findings were not statistically significant

American College of Cardiology/American Heart Association (ACC/AHA) Guidelines for the Management of Patients with Acute Myocardial Infarction serve as both guide and benchmark to health care providers involved in the care of the MI patient. Recommendations suggest that an acute MI protocol be in place, whereby all patients with ischemic type chest discomfort should be rapidly evaluated and a 12 lead ECG performed ideally within 10 minutes, and not more than 20 minutes. A door to needle time of less than 30 minutes is suggested, and if primary PTCA is the reperfusion strategy of choice, then the patient should arrive in the Cardiac Catheterization Laboratory in less than 60 minutes (Ryan et al., 1996). In this sample, only 38.4% of MI patients had an ECG by 10 minutes and a total of 64.4% by 20 minutes, while 50% and 68.2 % of

STEMI patients had an ECG by 10 and 20 minutes respectively. When the entire sample is considered, 32.3% of patients had an ECG by 10 minutes and 64.9% by 20 minutes. Results were similarly poor for door to doctor times, with 28.4% of MI patients and 19.2% of the total sample seeing a physician by the 20-minute mark. Only two variables in the MI subgroup were associated with a significant difference in door to doctor times; family history and dizziness, in addition to chest pain or other presenting symptom. In the total sample, a history of MI, PTCA, and CABG were associated with a decreased door to doctor time. None of the STEMI patients received thrombolytic therapy by 30 minutes, and only 22.2 % had been thrombolyzed 1 hour after arriving at the hospital. Similarly, none of the four patients undergoing Primary PTCA, were in the Cardiac Catheterization Laboratory at the 1-hour mark, instead, the wait ranged from 1.2 to 7.1 hours.

It is uncertain why times to treatment deviated considerably from the established benchmarks. The fact that the ED was on ambulance diversion nearly one third of the time, hints at a department that was lacking the required resources in terms of space, and/or staff. Staff mix either because of turnover, vacancies, or vacation may not have been at the usual levels, impacting the time required to assess and treat patients. In addition, the ED was preparing to move to a new location in September 2000, and this may also have affected treatment times.

Management Strategies for the Sample

Standard diagnostics, including 12 lead ECG, cardiac markers, CXR, hemoglobin, platelet count, white blood cell count, electrolytes, and measures of renal function, were performed on this cohort. Additional diagnostics such as exercise stress tests and CT scans were completed as required to clarify the diagnosis. Although times to treatment

were above the desired level, reperfusion choices were appropriate and met current practice guidelines (Ryan et al., 1996). Aspirin was recorded as administered to 57.1% of the patients either by EMS personnel or ED staff. ACC/AHA guidelines recommend patients receive ASA as part of the initial management (along with cardiac markers and triage for rapid care) of patients with chest discomfort thought to be ischemic in nature. Although this percentage is low, the number of patients who took ASA at home either routinely, or at the onset of discomfort was not captured and may account for a portion of the other 42.9% of patients.

Outcomes of the Sample

Data compiled by Goldman et al. (1988), Rouan et al. (1987), and Tierney et al. (1986), indicated that in addition to the 10-15% of patients diagnosed with MI, additional patients presenting to the ED with chest pain would be diagnosed with unstable angina (10-15%) and another 20-30% would have a diagnosis of non-cardiac origin, thereby leaving between 40% and 60% of patients without a clear diagnosis, thus requiring a lengthy and expensive workup to pinpoint the nature of their discomfort. Findings from this study were similar with 14.8% of patients diagnosed with MI, 13.5% with unstable angina, 8.8% with a non-cardiac origin, and 44% with a diagnosis of chest pain NYD. As the sample was directed at chest pain of a cardiac nature, the percentage of non-cardiac cases is not unexpected. Of the chest-pain NYD patients, 79.9% were not scheduled for follow up, 9.0% were to return for an exercise stress test, and 1.8% for a myocardial perfusion scan. Furthermore, 8 patients (3.6%) from this cohort returned to Emergency within 30 days and of these, 4 (50%) were admitted. As the study was retrospective, the

investigator was unable to track patients through other hospitals to determine if they presented elsewhere with similar complaints.

Patients discharged from ED without diagnosis or plans for follow-up, is a serious concern with potential legal implications. Many Emergency Departments in the United States have chest pain observation units for patients who present with symptoms compatible with ischemic heart disease, but non-diagnostic ECGs. Although treatment protocols vary, one of the more common is a 9-hour regimen which includes continuous, 12 lead ECG monitoring, cardiac marker sampling, and concludes with a exercise stress test performed in the ED, which if negative, clears the way for the patient to be discharged with relative confidence that his/her problem is not cardiac in origin. He can then be referred back to the family physician for further investigation and follow up.

Limitations of the Study

Use of a secondary source, as a means of data collection is one of the biggest limitations of this, and many other retrospective studies, particularly when the data are of a qualitative nature. What is recorded on the source document has already been filtered and interpreted by the recorder, and that immediately changes the nature of the account, unless it is entered verbatim. Furthermore, if data is absent, it is unknown if it is secondary to a recording error, whether the patient did not experience that sign or symptom, or simply if the patient was not examined or questioned about the topic.

Although the number of MI patients is consistent with expectations, the overall sample size was too small in many instances to draw meaningful conclusions from the data. As was discussed earlier, many of the study findings demonstrated a trend similar to the literature, however this could not be validated because of insufficient numbers. Similarly,

because of a large discrepancy between the number of MI and non-MI patients, results for the total sample were often influenced by the non-MI population.

As the study was retrospective, the investigator was unable to link patients with Alberta Health. Such data linkage could have provided statistics on 30-day morbidity and mortality, however only figures from the University of Alberta Hospital could be documented.

Implications of the Findings

Complete documentation of cardiac risk factors on the Emergency Record was lacking in up to one third of the sample. Failure to take and record a complete chest pain history was one of the factors positively correlated with litigation in a study of 65 malpractice claims by Rusnak, Stair, Hansen, and Fastow (1989). It is imperative that health care practitioners record the results of the patient history and physical examination, as well as treatments and their effects accurately and completely. Failure to do so can result in treatment delay, increased risk of litigation, and can seriously undermine the ability of a department to engage in quality improvement initiatives based on patient profiles and changing trends.

Nearly half of the patients in this sample were over the age of 65 years, and were noted to have significantly more medical conditions, and were on more medications than their younger counterparts. As this sector of our population continues to grow, this cohort will have a growing influence on the use and availability of health care resources. Clinics that are focused on the maintenance and management of the health of well seniors, may help prevent the progression of easily correctible problems, thus reducing the need for hospitalization. Education of future health care professionals must reflect the growth of

this cohort, and ensure they are well prepared to meet the challenge of caring for older individuals with complex health profiles.

Although women in the study presented to hospital more quickly than men, they experienced longer delays in having an ECG completed, and in being examined by the physician, than did their male counterparts. This was noted not only in the total sample, but in the MI subgroup as well. In addition, men in the MI subgroup who presented with symptoms classified as "other" were seen significantly faster than were women with similar complaints. Significantly greater numbers of women in the MI subgroup were taking sleeping pills or anxiolytics compared to their male counterparts on presentation to the Emergency Department. Finally, the mortality rate for women in the MI subgroup was nearly double that of men. When these findings are considered collectively, the question of whether men and women are being treated differently by the health care system must be addressed.

Data on time to treatment measures were influenced by the small number of MI patients in the study, and perhaps by the dynamics of the Emergency Department during the time of data collection. Differences between men and women for example, may be due to delays in the triage process, or may reflect impediments at other points in the system. Patients enrolled in clinical trials often have lower times to treatment due to the presence of a study team whose only focus is that patient. If it can be demonstrated that goals for door to drug time can be achieved when adequate resources are in place, then administrators are compelled to act on those findings. A larger study, focusing specifically on the treatment phase (door to data, door to doctor, and door to drug), and

how patients are triaged and managed in the presence of ischemic chest discomfort needs to be undertaken to provide a baseline for quality improvement.

Of the patients admitted to hospital, 19% required transfer to another facility due to lack of beds at the University of Alberta Hospital. Assuming patients' choice of hospital is generally not a random one, the effect of such transfers on patient satisfaction must be questioned. Research into the experiences of patients and their families when a patient transfer occurs in the presence of life threatening illness, may provide recommendations as to how health care professionals can better support patients and their families in this situation.

Conclusion

Chest pain is one of the most common complaints of patients presenting to the Emergency Department. This study was undertaken to describe the characteristics, diagnostic evaluation, management strategies, and outcomes of patients presenting to the Emergency Department of the University of Alberta Hospital with non-traumatic chest pain. The sample was similar to those described in the literature in terms of demographics, risk factor profiles, clinical presentation and management; however, small numbers of MI patients prevented age and gender comparisons from reaching statistical significance. Patients over the age of 65 years, comprising nearly half the sample had significantly more medical conditions and were on significantly more medications than their younger counterparts. Time to treatment measures were found to deviate somewhat from the literature. Median presentation times of STEMI patients in this study were one third longer than those of U.S. patients, but were less than 10% longer than patients from outside the U.S. (Newby, 1996). Also, patient history and symptom presentation had less

effect on presentation time than has been described in the literature. Recommended time to treatment goals proved difficult to achieve, but again, results of the study were affected by the small numbers of MI patients. Patient outcomes, particularly those involving length of time spent in the Emergency Department and patient disposition, are unique to this sample, but serve as a baseline for further investigation with the goal of improving patient care and patient satisfaction.

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Appendix A

NON-TRAUMATIC CHEST PAIN DATA COLLECTION FORM | **STUDY ID** _____

DOB: _____ _____ _____ (dd mm yy)
Gender: ☐ Male ☐ Female

Race: ☐ Aboriginal ☐ Caucasian ☐ Asian ☐ East Indian ☐ Black ☐ Other _____

Marital Status: ☐ Single ☐ Married ☐ Widowed ☐ Divorced ☐ Common-law ☐ Separated

CRF: ☐ Diabetes ☐ Family history ☐ Elevated cholesterol ☐ Hypertension ☐ Current smoker ☐ Past smoker ☐ Never smoked ☐ None

Medical History:
☐ Angina ○ Stable ○ Unstable
☐ MI
☐ PTCA
☐ CABG
☐ CHF
☐ No cardiac history
☐ Stroke
☐ COPD
☐ Thrombolytic
☐ ReoPro
☐ Arrythmia ☐ V ☐ A
☐ Other _____
☐ TIA
☐ Renal insufficiency
☐ Ulcer
☐ GERD
☐ Aneurysm ○ Cerebral ○ Abdominal

CHEST PAIN: Time of onset: _____
Location of Pain (most severe):
☐ Chest
☐ Back
☐ Other _____

Radiation (check all that apply):
☐ Arms ○ R ○ L
☐ Throat
☐ Neck ☐ Other _____

QUALITY OF PAIN: (check all that apply)
☐ Pressing, crushing
☐ Tightness
☐ Burning
☐ Aching
☐ Heavy
☐ Numbness
☐ Indigestion
☐ Unable to describe
☐ Other _____

ASSOCIATED SYMPTOMS: (check all that apply)
☐ Diaphoresis
☐ Shortness of Breath
☐ Dizziness
☐ Nausea
☐ Vomiting
☐ Palpitations
☐ Fatigue
☐ Fainting
☐ Other _____

PAIN IS REPRODUCED BY: (check all that apply)
☐ Deep breathing
☐ Palpation
☐ Change in position
☐ Not able to reproduce
☐ Other _____

SIMILAR PAIN IN PAST? ☐ No ☐ Yes
If yes, how long ago? _____

Seek treatment: ☐ Yes ☐ No

Diagnosis
☐ MSK
☐ GI
☐ Angina
☐ MI
☐ Other _____

NON-TRAUMATIC CHEST PAIN DATA COLLECTION FORM

STUDY ID

TIME TO TREATMENT:

ER Arrival	___ / ___ /	___ ___ :		
1st ECG	___ / ___ /	___ ___ :		
Phys. Contact	___ / ___ /	___ ___ :		
Diag. ECG	___ / ___ /	___ ___ :		
Order to Throm	___ / ___ /	___ ___ :		
Throm Started	___ / ___ /	___ ___ :		
Cardio Called	___ / ___ /	___ ___ :		
Cardio Arrived	___ / ___ /	___ ___ :		

1st ECG:
- ☐ ST Elevation ____ lead
- ☐ ST Depression ____ lead
- ☐ RBBB
- ☐ LBBB
- ☐ Non-specific ST/ T Wave change
- ☐ Other _____
- ☐ Normal

Old ECG for comparison: ☐ Yes ☐ No

CLINICAL PRESENTATION: BP: _____ HR: _____ TEMP: _____

- Killip I ☐
- Killip II ☐
- Killip III ☐
- Killip IV ☐

ARRIVAL: EMS ___ CAR: ___ WALK: ___

LABS:

Time	Hgb _____ Troponin I	Plts _____ CK	WBC _____ CKMB	INR _____ Na+ _____ Ca+ _____ Urea _____ Glucose _____	PTT _____ K+ _____ Mg+ _____ Creatinine _____

MEDS:

☐ ASA

☐ Nitro
- O Sublingual
- O Patch
- O I.V.

☐ Beta Blocker
- O I.V.
- O P.O.

☐ Heparin
- O I.V.
- O LMWH

☐ Inotropes
- O Dopamine
- O Dobutrex
- O Epinephrine
- O Levophed

☐ Antiarrhythmic
- O Amiodarone
- O Digoxin
- O Procainamide
- O Xylocaine
- O Other

☐ Thrombolytic
- O T-Pa
- O SK
- O r-PA
- O TNK
- O Staphylokinase

☐ GP IIb/IIIa
- O ReoPro
- O Integrelin
- O Aggrastat

☐ Analgesic
- O Acetaminophen
- O Tylenol #3
- O Morphine
- O Fentanyl
- O Demerol

☐ Other
- O Pink Lady
- O Djovol
- O Gravol
- O Maxeran
- O Lasix
- O Other _____

DIAGNOSTICS:

☐ CXR
- O No acute disease
- O Other _____

☐ Stress Test
- O Normal
- O Non-diagnostic
- O Positive

☐ CT Scan
- O Normal
- O Other _____

☐ Echo
- O Normal
- O Wall motion abnormality

EF% _____

DISPOSITION:

☐ Admitted

Admission Diagnosis: _____

- O Cardiology
- O Medicine _____
- O CCU
- O ICU
- O Other _____

☐ Consults

☐ AMA

☐ Discharged

Discharge Diagnosis _____

Time in ER _____

OUTCOMES TO 30 DAYS:

☐ Death ☐ Re-admission

☐ Non-fatal MI ☐ Urgent revascularization

Trop I _____

Peak CK ____ MB ____

LOS (in-pt) _____